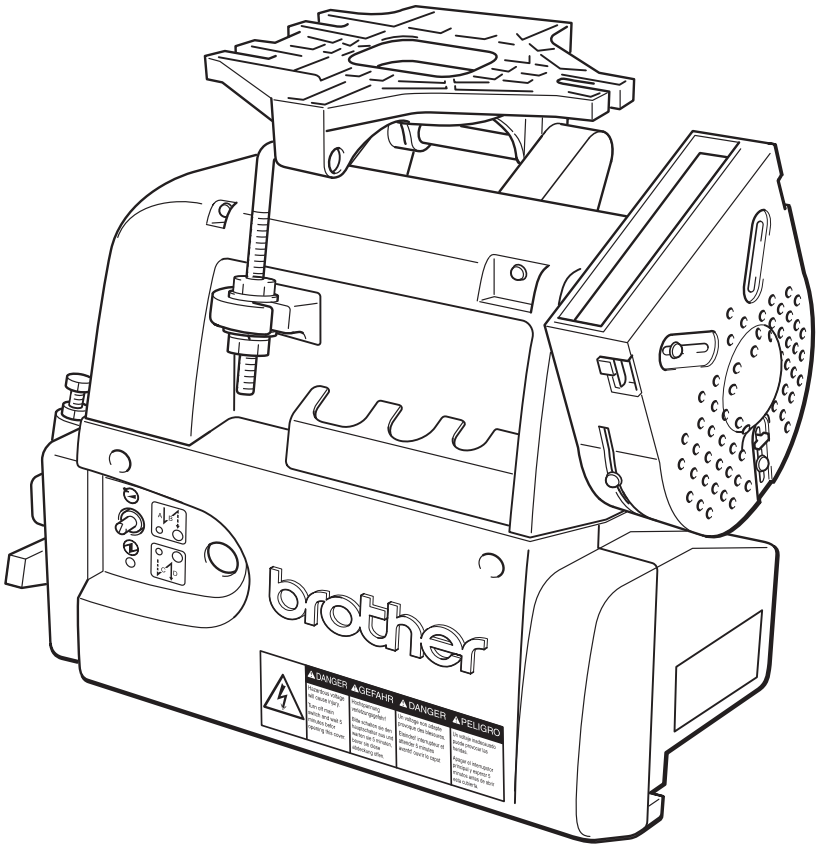
brother

MD-600 Series

AC Servomotor for Industrial Sewing Machines

SERVICE MANUAL

MD-602 (Single-Phase Power Specifications)
MD-612 (Three-Phase Power Specifications)



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Thank you for purchasing this Brother general-purpose sewing machine motor. Before using the motor, please be sure to read the Safety Instructions and the explanations of how to use the motor which are contained in this manual.

Furthermore, because we are continually improving our products as a result of continuing research, the specifications for the product which you have purchased may differ slightly from those listed in this manual.

SAFETY INSTRUCTIONS

1. SAFETY INDICATIONS AND THEIR MEANINGS

This instruction manual and the indications and symbols that are used on the machine itself are provided in order to ensure safe operation of this machine and to prevent accidents and injury to yourself or other people.
The meanings of these indications and symbols are given below.

Indications

⚠ WARNING	Failure to observe the instruction which appears after this indication while using the motor will result in death or severe injury to the user.
⚠ CAUTION	Failure to observe the instructions which appear after this indication while using the motor may result in slight to moderate injury to the user, or physical damage.

Symbols

The symbols which are used in this manual and their meanings are shown below.

	This symbol is used to indicate the danger of electric shocks.
	This symbol is used to indicate general cautions that should be observed.
	This symbol is used to indicate that the ground connection must be made.
	This symbol is used to indicate general actions which you must do.

2. CAUTIONS WITH REGARD TO SAFETY

Following is a compilation of all the warnings and cautions which appear throughout this manual.

⚠ WARNING

Wait at least 5 minutes after turning off the power switch before opening the cover of the control box. Touching areas where high voltages are present can result in severe injury.

⚠ CAUTION

Do not use the motor near sources of strong electrical interference. If the motor is installed in a location which is close to sources of strong electrical interference such as high-frequency welders, it may cause problems with correct operation of the sewing machine.

Disconnect the power cord plug from the wall outlet before installing the motor.

The motor and control box weigh approximately 13 kg. Take care not to drop them on your feet when installing or removing them from the work table.

Be sure to tighten the nuts securely.
If they are not tightened properly, it could cause the sewing machine to vibrate or shift its position while sewing.

Turn off the power switch and wait for the power indicator on the panel display to turn off before connecting and disconnecting any of the connectors.

Turn off the power switch before inserting or removing the AC power cord plug.

Be sure to connect the power supply to a secure ground. If the ground is not securely connected, electric shocks may result.

Use a lamp which is rated at 6 V AC and 20 W or less as the head lamp.
If a lamp with a higher rating than this is used, it could cause the lamp wires and the transformer to overheat and burn out.

Confirm that the power supply matches the motor and the control box specifications before turning on the power switch.
The motor, control box or sewing machine could be damaged if the supply voltage is too high.

Do not clamp the cords inside the control box when closing the control box cover.

Turn off the power switch before connecting the cords, otherwise damage to the control box, synchronizer, operation panel or material edge sensor may result.

Any fluctuations in the power supply voltage should be within ±10% of the rated voltage for the motor.
Voltage fluctuations which are greater than this may cause problems with correct operation of the sewing machine.

Use a power supply with a capacity which is in excess of the motor power capacity.
Insufficient power supply capacity may cause problems with correct operation of the sewing machine.

The ambient temperature should be within the range of 5°C to 35°C during use.
Temperatures which are lower or higher than this may cause problems with correct operation of the sewing machine.

The relative humidity should be within the range of 45% to 85% during use, and no dew formation should occur in any devices.
Excessively dry or humid environments and dew formation may cause problems with correct operation of the sewing machine.

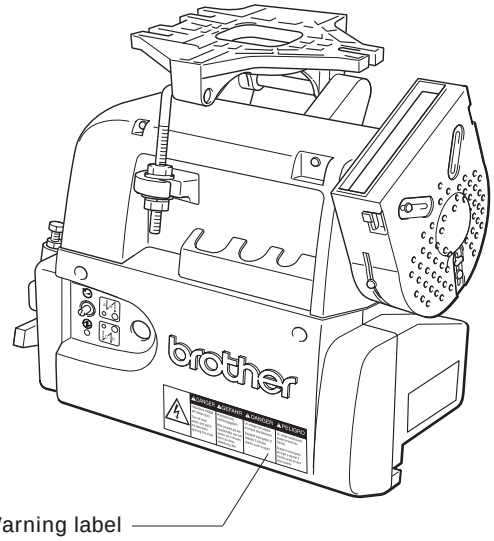
Avoid exposure to direct sunlight during use.
Exposure to direct sunlight may cause problems with correct operation of the sewing machine.

In the event of an electrical storm, turn off the power and disconnect the power cord from the wall outlet.
Lightning may cause problems with correct operation of the sewing machine.

3. WARNING LABEL

The warning label shown below is affixed to the cover of the control box. Please follow the instructions on the label at all times when using the motor. If the label has been removed or is difficult to read, please contact your nearest Brother dealer.

⚠DANGER	⚠GEFAHR	⚠DANGER	⚠PELIGRO
Hazardous voltage will cause injury. Turn off main switch and wait 5 minutes before opening this cover.	Hochspannung verletzungsgefahr! Bitte schalten sie den hauptschalter aus und warten sie 5 minuten, bevor sie diese abdeckung ffnen.	Un voltage non adapt provoque des blessures. Eteindrel'interrupteur et attendre 5 minutes avantd' ouvrir le capot	Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.



Warning label

1. Outline

1.1 Features

- Thread trimming motor MD602/MD612 is a low-priced version of the MD601/611.
- Start tacking (2 to 9 stitches) and end tacking (2 to 9 stitches) are possible even without the operation panel (option).
- Voltage specifications for the single-phase 100V system, single-phase 200V system and 3-phase 200V system are available.
- The rated output is 400W.
- The motor torque has been greatly increased compared to the MD601/611.

1.2 Combination with Brother sewing machines

1. Single needle lockstitch machines (forward rotation)
B737, (B201) B791, B774, B722, B724, B748A, B798, B728, B772A, B778A, B781, B852, B853, B854, B883

2. Twin needle lockstitch machines (forward rotation)
B842, B872, B845, B875, B847, B848, B837, B877, B878

3. Overlock machine (reverse rotation)
(Note) The motor connections do not need to be changed to enable reverse rotation.

4. Post-type sewing machine (forward rotation)
P73, P81, C51

1.3 Options

- Operation panel F-20, F-40, F-100
- Material edge sensor II, material edge sensor IV, B sensor, bobbing thread detector
- Standing work pedal (variable speed pedal, 2-speed pedal)

1.4 Input/output

- Solenoid output: Four outputs (thread trimming, thread wiper, reverse run, presser foot lift) + one output for options

1.5 Miscellaneous

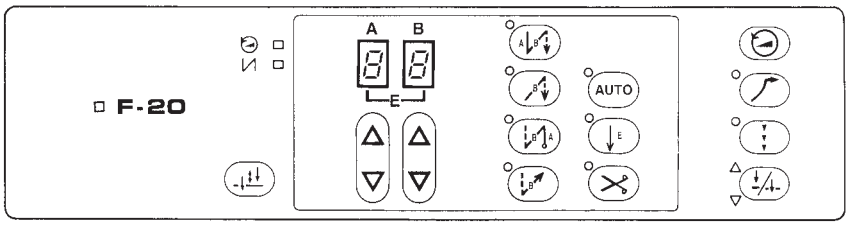
- Lamp terminal block and fuse mounted on control PCB.
- Only high-speeds are set with the head setting mode.
- Incompatible with magnetic synchronizer.

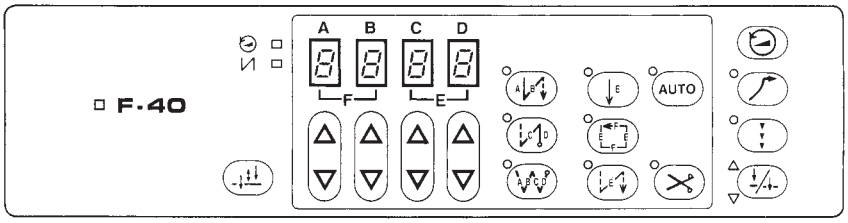
2. Operation panel and options

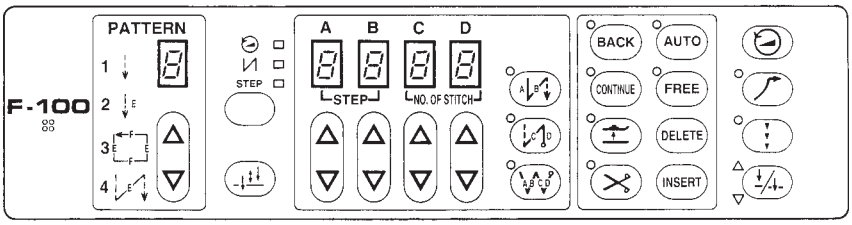
Attachable operation panel F-20 (X-20)
F-40 (X-40)
F-100 (X-100)

Attachable options Standing work pedal
Material edge sensor (Connect to S2 operation panel and use)

(Note 1) A built-in type panel for B737 and an external type (twin needle, etc.) F-panels are available.
(Note 2) The X-panels can be used with the MD600 Series, but these panels do not have the stitching speed switch [ ].
(Note 3) The E-panel for the MD800 series cannot be used with the MD600 Series.

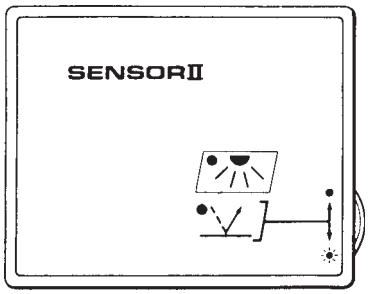


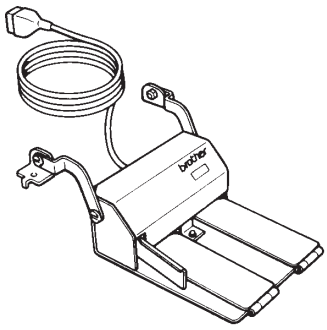


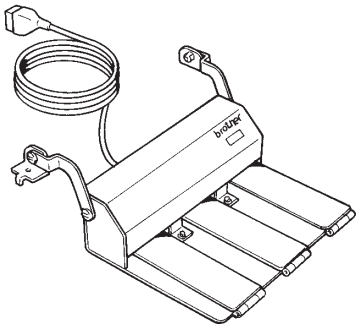


Assembly cord for standing work

Standing treadle 40 variable speed #6	J80081-040	#8	J80380-040
Standing treadle two speed			J80630-001



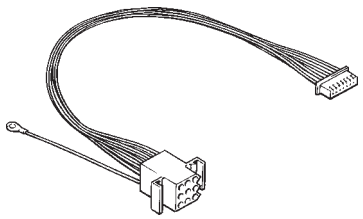




Operation panel

Sewing machine model	Installation type	Type	Code no. of operation panel
B737MK II	built-in	F-20 F-40 F-100	137-207-711-11 137-207-712-11 137-207-713-11
B201	built-in	BF-20 BF-40 BF-100	137-207-811-11 137-207-812-11 137-207-813-11
Operation panel (without install plate)	attached	F-20 F-40 F-100	137-207-711-10 137-207-712-10 137-207-713-10

Foot plug J02824-001



3. Model configuration

● Japanese / English;
Name Plate, Warning Label
Instruction Manual

	Panel type	Japanese/ English	Treadle type
0	External (HB)	Japanese	C
1		English	
5			D
7	Built-in (BI)	Japanese	C
3		English	
8			D

● C; With one forward and one back step
D; With two forward and two back steps

Maximum rotation speed	
0	1000 rpm
1	2000 rpm
3	3000 rpm
4	3500 rpm
5	4000 rpm
6	4500 rpm
7	5000 rpm
8	6000 rpm
9	8000 rpm
A	2200 rpm
B	2400 rpm
C	2600 rpm
D	6500rpm

Panel type		
	BF panel	F panel
0	BF-0	F-0
1	None	None
2	BF-20	F-20
3	BF-40	F-40
4	BF-100	F-100

1 3 7 6 0 2 7 3 3 5 5

Single/3-phase	
0	Single-phase
1	3-phase

Compatible head			
Single needle		Twin needle	
0	B774	E	B842
1	B748A	F	B872
2	B798/728	G	B845/875
3	B722	H	B847
4	B724	J	B837
5	B201	K	B877
6	B791	L	B878
7	B737	M	P73/P81
8	B852/853/854	N	C51
9	B883	P	B848
A	Overlock		
B	B772A		
C	B778A		
D	B781		

For single-phase

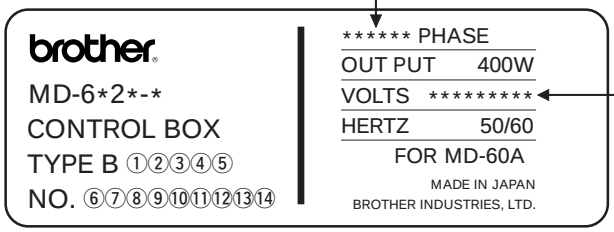
	Voltage	Switch	Destination
0	240V	SAA compatible part	Australia
1	110V	Standard part	General
2	110V	With OCR	USA
3	110V	SJT	Canada
4	230V	None	Europe
5	220V	Standard part	General
6	230V	Standard part	Greece
7	230V	Standard part	General
8	230V	SAA compatible part	New Zealand
9	100V	Domestic specifications	Japan
A	240V	Standard part	General
B	110V	SJT + OCR	Canada
C	220V	With OCR	General
D	220V	SJT + OCR	Canada
E	220V	FOR B883	General

For 3-phase

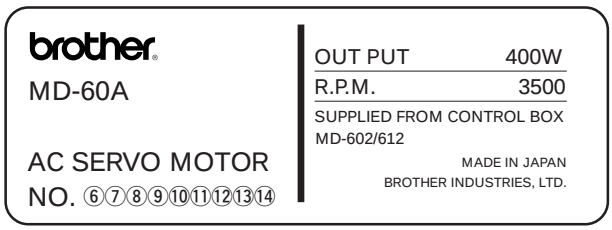
	Voltage	Switch	Destination
0	200V	Domestic specifications	Japan
1	220V	Standard part	
2	220V	With OCR	USA
3	220V	With SJT	Canada
B	220V	With SJT & OCR	Canada

4. Explanation of the name plate

Control box name plate



Motor name plate



phase	voltage	display			
		phase	voltage		
single	110V	SINGLE			110
single	220V	SINGLE	[220]	230	240
single	230V	SINGLE	220	[230]	240
single	230V CE	SINGLE			230
single	240V	SINGLE	220	230	[240]
three	220V	THREE			220

⑥	production date
A	January
B	February
C	March
D	April
E	May
F	June
G	July
H	August
J	September
K	October
L	November
M	December

⑦⑧	year (2 digits)

⑨	factory
9	Kariya

⑩	modification No.

⑪⑫⑬⑭	serial No.

①	Treadle type
C	One forward and one back step
D	Two forward and two back step

②	Pulley size
3	ϕ 90
4	ϕ 105

⑤	standard
0	None
A	Australia
E	CE

③	maximum speed (rpm)
0	1000
1	2000
2	2500
3	3000
4	3500
5	4000
6	4500
7	5000
8	6000
9	8000
A	2200
B	2400
C	2600
D	6500

④	Machine Head (Single needle)	Model No.
0	B774	MD-6*2-1
1	B748A	MD-6*2-1
2	B798/728	MD-6*2-1
3	B722	MD-6*2-1
4	B724	MD-6*2-1
5	B201 (B755)	MD-6*2-1
6	B791	MD-6*2-1
7	B737	MD-6*2-1
8	B852/853/854	MD-6*2-1
9	B883	MD-6*2-5
A	OVERLOCK	MD-6*2R-1
B	B772A	MD-6*2-1
C	B778A	MD-6*2-1
D	B781	MD-6*2-1

④	Machine Head (Twin needle)	Model No.
E	B842	MD-6*2-1
F	B872	MD-6*2-1
G	B845/875	MD-6*2-1
E	B847	MD-6*2-1
J	B837	MD-6*2-1
K	B877	MD-6*2-15
L	B878	MD-6*2-15
M	P73/P81	MD-6*2-9
N	C51	MD-6*2-9
P	B848	MD-6*2-1

*	phase
0	single
1	three

5. Installation

⚠ CAUTION

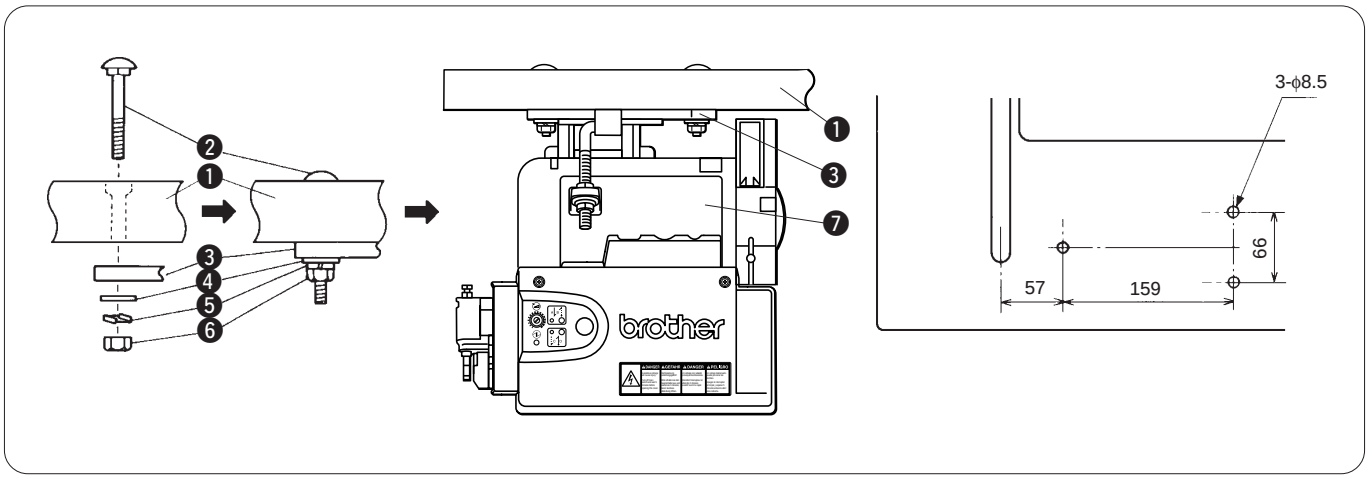
Do not use the motor near sources of strong electrical interference. If the motor is installed in a location which is close to sources of strong electrical interference such as high-frequency welders, it may cause problems with correct operation of the sewing machine.

Disconnect the power cord plug from the wall outlet before installing the motor.

The motor and control box weigh approximately 13 kg. Take care not to drop them on your feet when installing them to the work table.

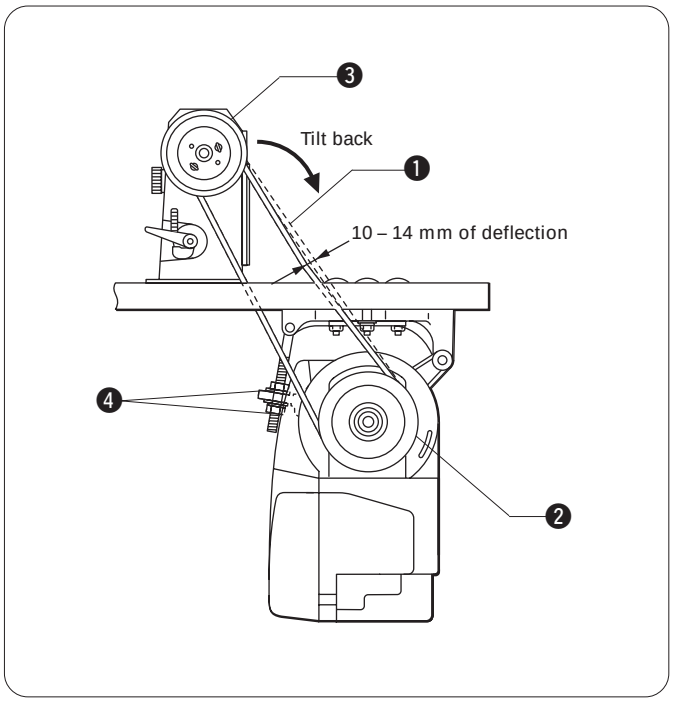
Be sure to tighten the nuts securely.
If they are not tightened properly, it could cause the sewing machine to vibrate or shift its position while sewing.

5.1 Installing the motor to the work table



1. Insert the bolts ❷ into the holes in the work table ❶ and then secure the motor ❼ to the work table ❶ by tightening the motor mounting brackets ❸ to the work table ❶ with the flat washers ❹, spring washers ❺ and nuts ❻ as shown in the illustration.
2. The positions of the work table ❶ holes are shown in the illustration.

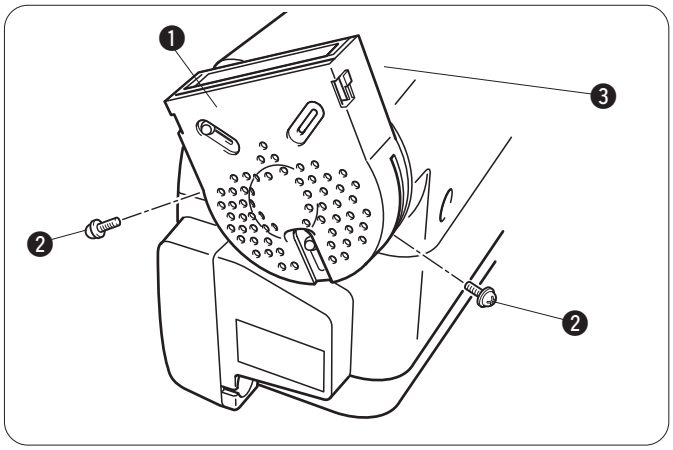
5.2 Attaching the belt



1. Tilt back the machine head and place the belt ❶ onto the motor pulley ❷ and the machine pulley ❸.
2. Turn the two nuts ❹ to adjust the deflection in the V-belt ❶ when the center of the belt is pushed.
   The recommended values are:
   1. For single-needle sewing machines and overlock machines, the deflection should be 10 – 14 mm when the belt is pushed with a force of 5 N (500 g).
   2. For twin needle sewing machines, the deflection should be 10 – 20 mm when the belt is pushed with a force of 10 N (1 kg).

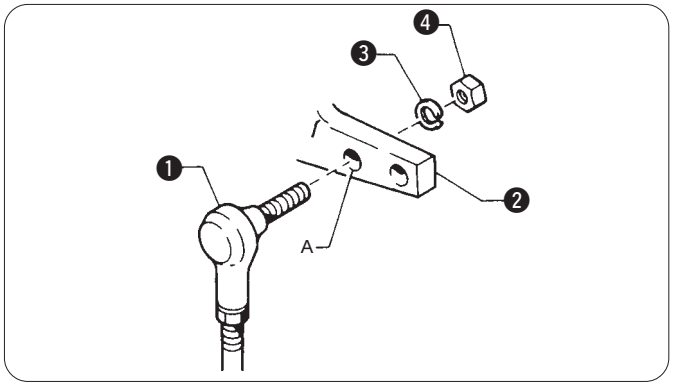
   Note:
   While using the sewing machine, the belt will conform to the pulley and cause the belt tension to loosen. If the belt tension is too loose, the following problems can occur.
   1. The stopping position may shift.
   2. An abnormal noise may be heard due to belt slippage.
   3. The belt may become too loose and contact the cover.
   4. When sewing heavy materials, the belt may slip on the pulley and the sewing machine may stop.

5.3 Installing the belt cover



1. Secure the belt cover ❶ to the motor ❸ with the two screws ❷ as shown in the illustration. At this time, position the belt cover ❶ so that it does not touch the belt.
2. A belt casting prevention guide and finger guide are provided on the belt cover. Refer to “5.5 Adjusting the belt cover safety mechanisms” on this page.

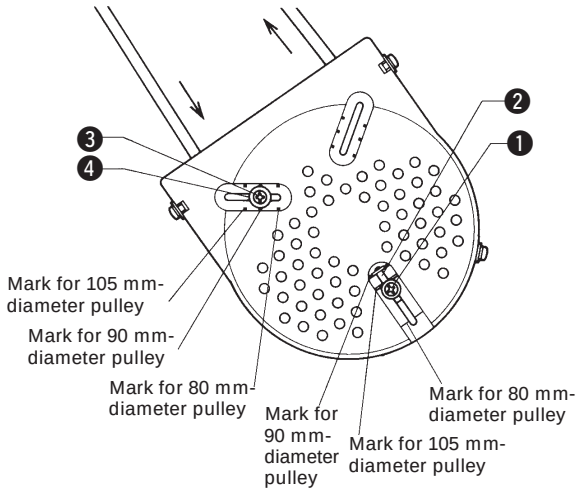
5.4 Connecting the connecting rod



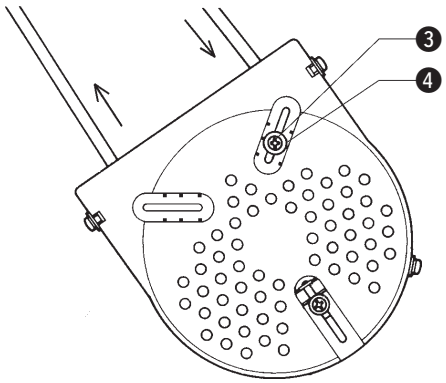
- Pass the connecting rod joint ❶ through hole A in the treadle lever ❷, and tighten it with the spring washer ❸ and nut ❹.
- Adjust the position of the machine treadle plate so that the connecting rod is perpendicular to the treadle plate.
  Note:
  The treadle pressure is adjusted to the position of hole A at the time of shipment from the factory. Refer to “6. Adjusting the treadle unit”.

5.5 Adjusting the belt cover safety mechanisms

Forward rotation



Reverse rotation (Overlock machines)



5.5.1 Adjusting the belt casting prevention guide

1. Loosen the screw ❶.
2. A mark showing the pulley size is stamped on the belt cover. (The available inner diameters are 90 mm, 105 mm and 80 mm.)
   Adjust the position of the belt casting prevention cover ❷ in accordance with the pulley size. Align the projection position with the mark. (For 80 mm diameter pulleys, install the belt casting prevention cover ❷ in the reverse direction.)
3. After adjusting, tighten the screw ❶.
   Note:
   This safety guide will prevent the belt from coming off even when the machine head is tilted back.

5.5.2 Adjusting the finger guard

1. Loosen the screw ❸.
2. Install the finger guard so that it is on the belt winding side.
3. A mark showing the pulley size is stamped on the belt cover. (The available inner diameters are 80 mm, 90 mm and 105 mm.)
   Adjust the position of the finger guard ❹ in accordance with the pulley size. Align the center of the screw with the mark.
4. After adjusting, tighten the screw ❸.
   Note:
   The finger guard is a safety mechanism that prevents fingers from being caught in the belt.
   Change the position of the finger guard ❹ to match the direction of rotation of the motor pulley.

5.6 Connecting the cords

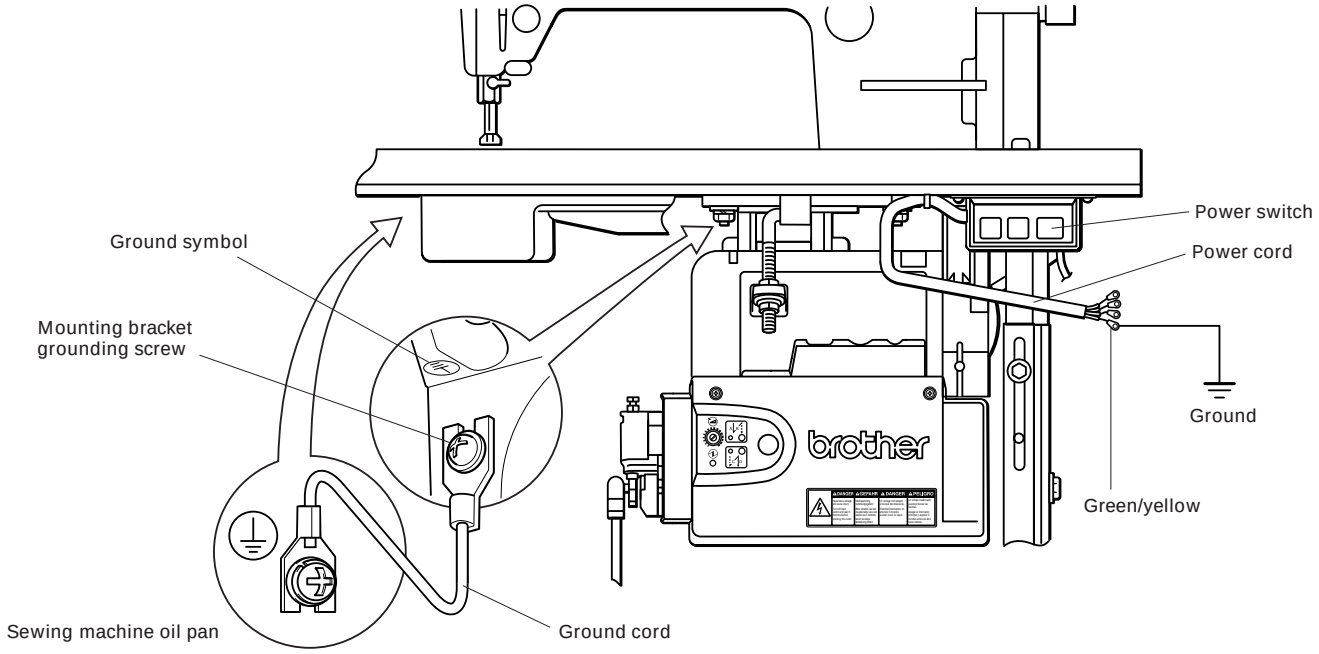
CAUTION

Turn off the power switch and wait for the power indicator on the panel display to turn off before connecting and disconnecting any of the connectors.

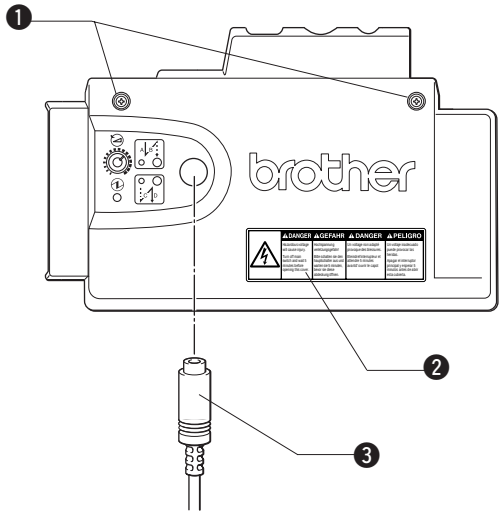
Turn off the power switch before inserting or removing the AC power cord plug.

Be sure to connect the power supply to a secure ground. If the ground is not securely connected, electric shocks may result.

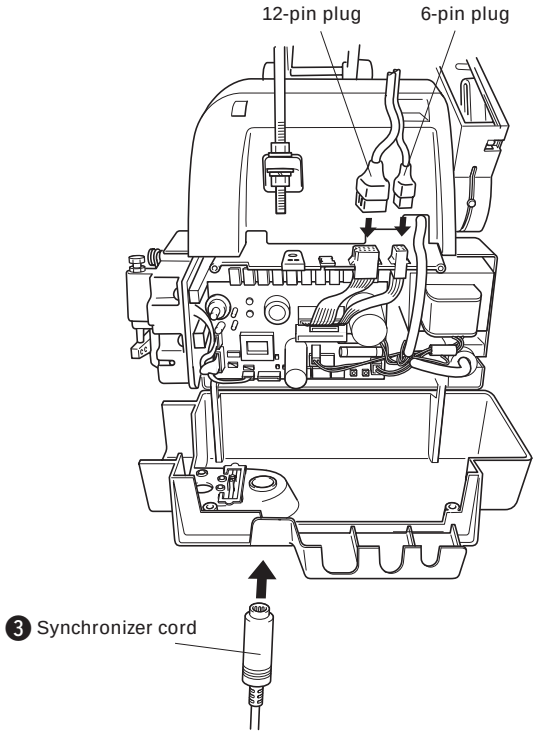
5.6.1 Connecting the power cord, power switch and ground cord



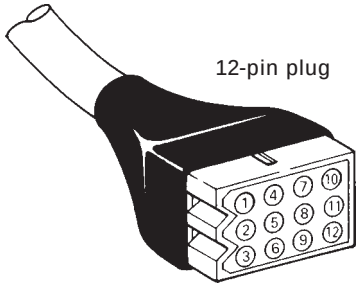
5.6.2 Connecting the sewing machine and control box



- Loosen the two screws ❶, and then gently pull the cover ❷ toward you to open it.
- Connect the 12-pin plug and the 6-pin plug.
- Close the cover ❷ (be careful not to clamp the cord) and tighten the two screws ❶.
- Connect the synchronizer cord ❸.



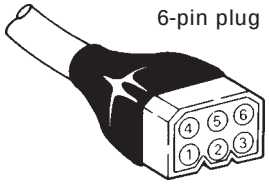
For machine solenoid



•12-pin plug terminal

12-pin plug	No.
Thread trimming solenoid	④·⑤
Thread wiping solenoid	⑦·⑧
Quick reverse solenoid	⑩·⑪
Quick reverse switch	⑨·⑫
Option output	①·②
Ground	③
Spare	⑥

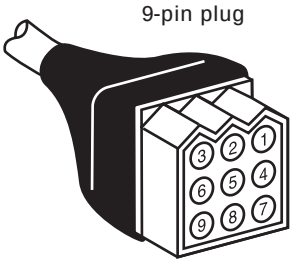
For presser foot lifter



•6-pin plug terminal

6-pin plug	No.
Presser lifter solenoid	①·④
40 V power supply	③
Knee switch	②·⑤
Ground	⑥

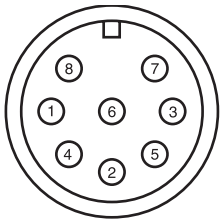
For standing pedal (option)



•9-pin plug terminal

9-pin plug	No.
High-speed switch	②
Low-speed switch	⑥
Thread trimming switch	③
Presser foot lift switch	⑦
+8 V	①
VSP	⑧
0 V	④
Ground	⑨
Spare	⑤

For synchronizer

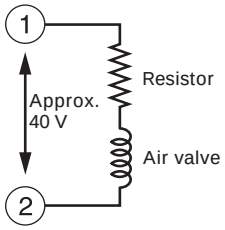


•8-pin plug terminal

8-pin plug	No.
Ground	①
+5 V	②
Needle down signal	③
0 V	④
NONP	⑤
Needle up signal	⑥
Encoder	⑦
Ground	⑧

Note:
The puller output is output from the option output during machine operation with the settings made at shipment from the factory.
Note the following points when connecting to the option output terminals.

a. Connect a solenoid or air valve with a resistance of 10 Ω or greater.
b. The voltage between the terminals should be equivalent to 40 V DC. When connecting an air valve, connect a resistor in series so that the rated voltage is obtained.
c. Never short circuit the output terminals.

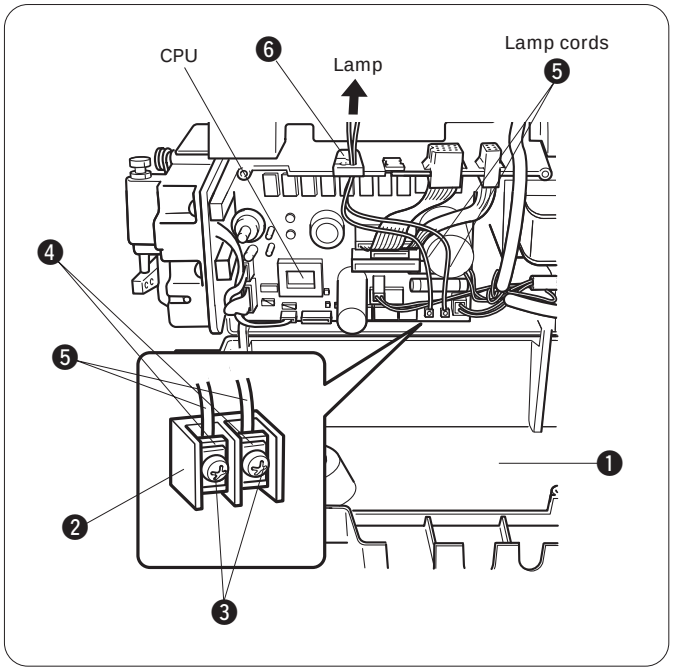


Note:
If using an automatic presser foot lifter, set the DIP switch SW1-3 on the circuit board to ON. (Refer to “7.5.2 Other DIP switch functions”.)

5.7 Installing the head lamp

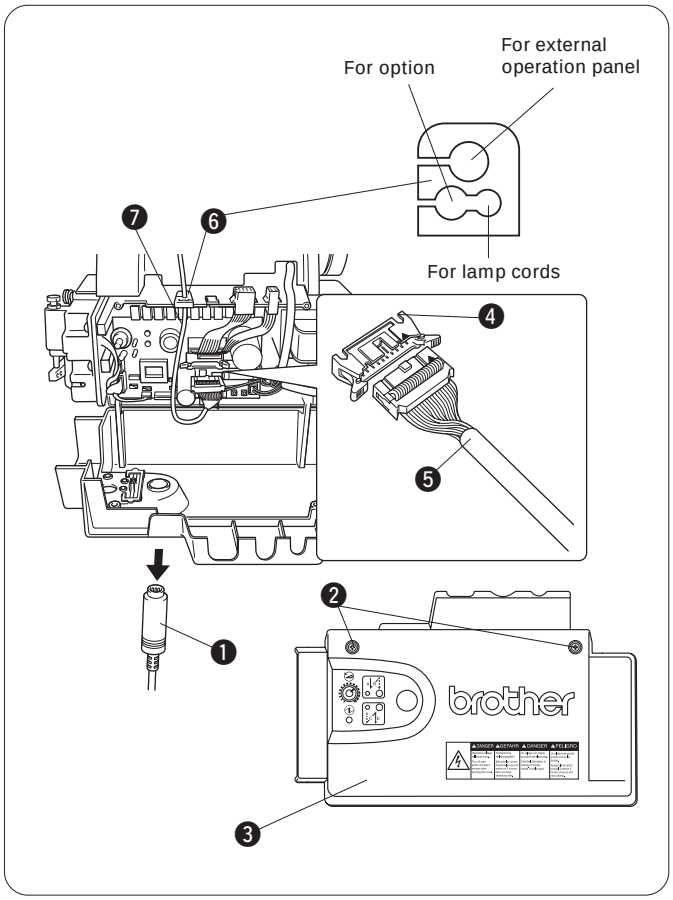
CAUTION

Use a lamp which is rated at 6 V AC and 20 W or less as the head lamp.
If a lamp with a higher rating than this is used, it could cause the lamp wires and the transformer to overheat and burn out.



1. Open the control box cover ❶.
2. Loosen the screws ❸ of the terminal block ❷, insert the lamp cords ❺ into the clamps ❹ as far as they will go, and then tighten the screws ❸.
   Note:
   Do not tighten the screws ❸ too tightly, as this may damage the terminal block ❷.
3. Pass the lamp cords ❺ through the rubber plug ❻.
   Refer to the illustration of the rubber plug ❻ in "5.8 Connecting the external operation panel" at below-left on this page at this time.
4. Close the control box cover ❶.

5.8 Connecting the external operation panel



1. The F-20, F-40 and F-100 operation panels can be used.
2. Disconnect the synchronizer cord ❶.
3. Loosen the screw ❷, and then gently pull the cover ❸ toward you to open it.
4. After opening the pawl of the circuit board connector ❹, align the ▼ mark on the operation panel connector ❺ with the ▼ mark on the circuit board connector ❹, and securely insert operation panel connector ❺ until the pawl locks.
5. Fit the rubber plug ❻ onto the operation panel cord ❼ as shown in the illustration, and then install the control box while being careful not to damage the cord ❼. (Break the membrane of the rubber plug ❻.)
6. Close the cover ❸ and secure it with the screw ❷. Be careful not to clamp any of the cords with the cover.
7. Connect the synchronizer cord ❶.

Note:
When an external operation panel is installed, the backtacking function of the control circuit board will be disabled, so use the external operation panel to carry out backtacking.

6. Adjusting the treadle unit

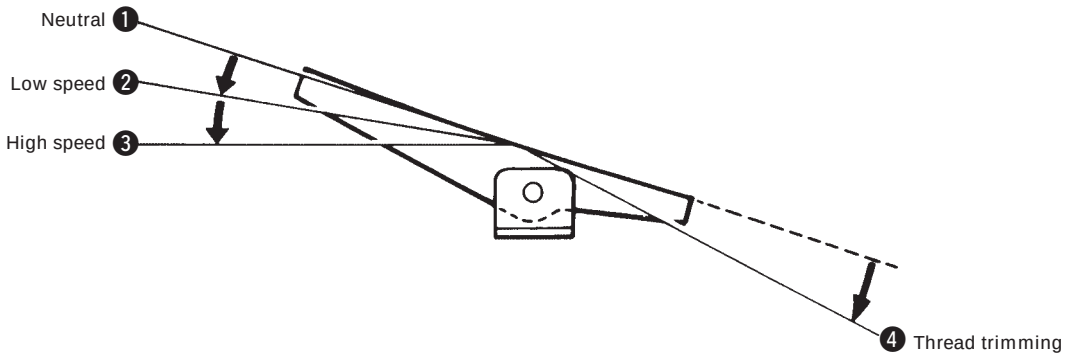
6.1 Operating the treadle

- There are two types of treadles, one with one forward and one rear stage and one with two forward and two rear stages. These are provided according to the destination of the machine.

6.1.1 For treadles with one forward and one rear stage

CAUTION

⚠ Take your foot off the treadle before turning on the power switch.



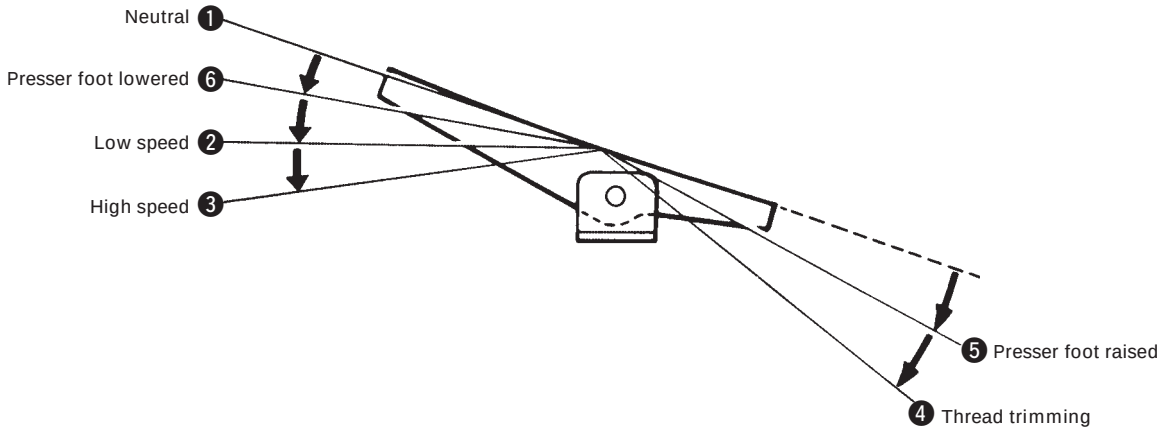
1. The treadle is at the neutral position ❶ when the treadle is not pressed.
2. When the treadle is gently depressed to position ❷, low-speed sewing is carried out. If it is then depressed as far as ❸, high-speed sewing is carried out.
3. When the treadle is pressed forward and then back to the neutral position ❶, the needle will stop below the needle plate (when needle down stop mode has been set).
4. When the treadle is depressed backwards to position ❹ (or when the treadle is pressed backward to position ❹ and is then returned to neutral position ❶), the thread trimmer operates, and then the needle will be raised and stop above the needle plate.
5. If using with the synchronizer cord disconnected
   - When the treadle is pressed forward and then back to the neutral position ❶, the machine will stop regardless of the needle position.
   - Thread trimming will not be carried out even if the treadle is pressed backed to position ❹. (The sewing machine does not operate.)
6. If an automatic presser foot lifter is being used
   - The presser foot will rise when the treadle is pressed backwards. If the knee switch is pressed, the pressure foot will not raise with the treadle operation, so raise and lower the presser foot with the knee switch.
   - When the treadle is pressed backwards and the thread is trimmed, the sewing machine will stop, and the presser foot will rise. To lower the presser foot, press the treadle backwards and then return it to the neutral position ❶. The presser foot can also be lowered using the knee switch. If the treadle is pressed forward, the sewing machine will operate after the presser foot lowers.

Note:
The presser foot can be raised and lowered by returning the treadle only from when the power switch is turned on to when the knee switch is operated.

6.1.2 For treadles with two forward and two rear stages

CAUTION

Take your foot off the treadle before turning on the power switch.



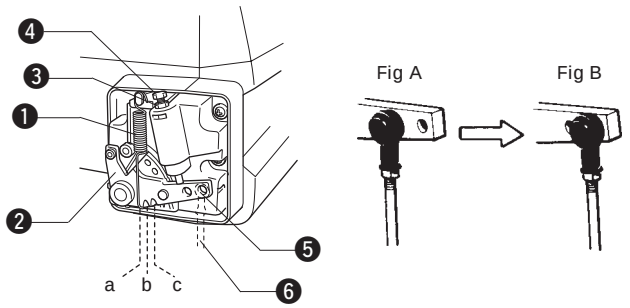
1. The treadle is at the neutral position ❶ when the treadle is not pressed.
2. When the treadle is gently depressed to position ❷, low-speed sewing is carried out. If it is then depressed as far as ❸, high-speed sewing is carried out.
3. When the treadle is pressed forward and then back to the neutral position ❶, the needle will stop below the needle plate (when needle down stop mode has been set).
4. When the treadle is depressed backwards to position ❹ (or when the treadle is pressed backward to position ❹ and is then returned to neutral position ❶), the thread trimmer operates, and then the needle will be raised and stop above the needle plate.
5. If using with the synchronizer cord disconnected
- When the needle is pressed forward and then back to the neutral position ❶, the machine will stop regardless of the needle position.
- Thread trimming will not be carried out even if the treadle is pressed backed to position ❹. (The sewing machine does not operate.)

6. If an automatic presser foot lifter is being used
- The presser foot will rise when the treadle is gently pressed back to the backward position ❺.
- The presser foot will lower when the treadle is returned to the neutral position ❶.
- The presser foot will lower if the treadle is gently pressed to the position ❻ while the presser foot is raised.

6.2 Adjusting the treadle

CAUTION

Turn off the power switch before starting work, otherwise the motor may operate, which could result in injury.



6.2.1 Adjusting the treadle pressure

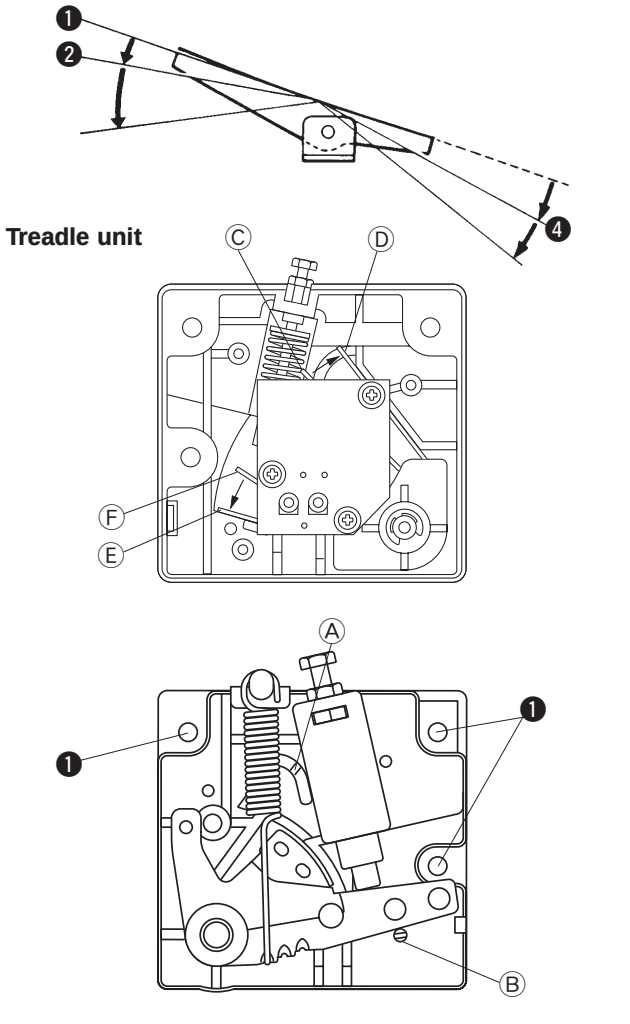
- If the machine starts running at a low speed when your foot is simply resting on the treadle, or if the treadle pressure is too weak, adjust the position (a to c) at which the treadle spring ❶ is hooked onto the treadle lever ❷.
  Note:
  The treadle pressure will increase from position a to position c.

6.2.2 Adjusting the treadle return pressure

- Loosen the nut ❸ and turn the bolt ❹. The treadle return pressure becomes heavier as the bolt ❹ is tightened, and becomes lighter as the bolt ❹ is loosened.

6.2.3 Adjusting the treadle stroke

- Remove the nut ❺, and then move the connecting rod joint ❻ from the position in figure A to the position in figure B. The treadle stroke will increase by approx. 1.25 times.
  Note:
  This adjustment will also affect the treadle pressure and the treadle return pressure, so these settings should be readjusted if necessary.



6.3 When using the automatic presser foot lifter device

1. When the treadle is depressed to position ❹, the presser foot is raised.
2. If you would like the treadle pressure to be lighter when it is depressed forward from the 2nd step to the 1st step, change the position of the spring from Ⓕ to Ⓔ.
   If you would like the pedal return to be from the 2nd step to the 1st step at this time, change the spring position from Ⓒ to Ⓓ.

- When changing the spring positions from Ⓕ to Ⓔ and from Ⓒ to Ⓓ, you must remove the three screws ❶ of the treadle unit and disconnect the treadle unit from the control box before changing the spring positions.

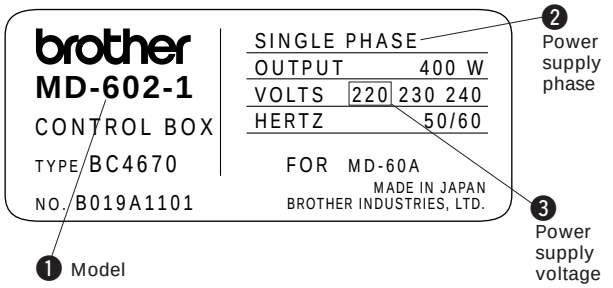
7. Using the control box

⚠ CAUTION

Confirm that the power supply matches the motor and the control box specifications before turning on the power switch. The motor, control box or sewing machine could be damaged if the supply voltage is too high.

7.1 Before turning on the power switch

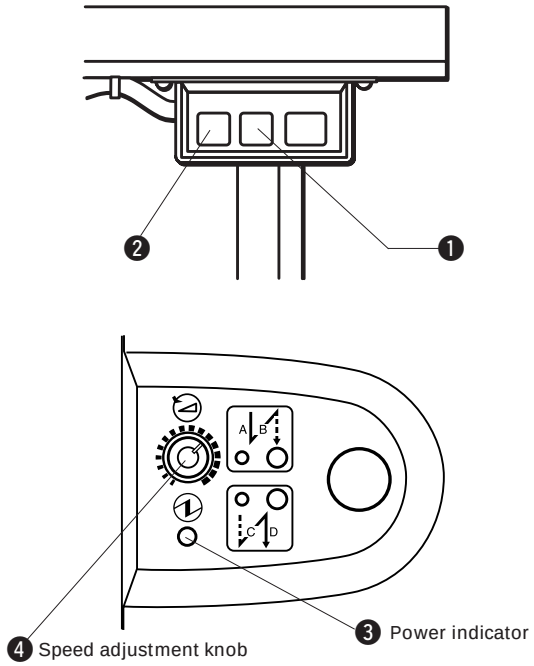
Control box rating plate (Example: Single-phase 220 V specifications)



- Check the power supply and the control box specifications.

1. Model ❶
   MD-602 (for single-phase power supply)
   MD-612 (for three-phase power supply)
   The model should match the power supply phase ❷.
2. The power supply voltage ❸ indicated is an AC voltage.
3. The power supply frequency can be either 50 Hz or 60 Hz.

1. Are all connectors connected correctly? • Synchronizer connector • Sewing machine connector • Ground cord	Refer to “5.6 Connecting the cords”.
2. Is the sewing machine cord touching the V-belt? Is the belt tension correct?	Refer to “5.1 Installing the motor to the work table” and “5.2 Attaching the belt”.
3. Does the sewing machine operate when turned gently by hand?	



7.2 Power switch and power indicator

- When the power ON switch ❶ is pressed, the power indicator (green) ❸ lights and the power turns on.
- When the power OFF switch ❷ is pressed, the power indicator (green) ❸ turns off and the power switches off.

7.3 Setting the sewing speed

- Turn the speed adjustment knob ❹ on the front of the control box clockwise to increase the sewing machine speed (the speed corresponding to the treadle depression amount), and turn it counterclockwise to reduce the speed.
- The maximum sewing speed that can be set is the sewing speed which is determined by DIP switch settings. Refer to “7.5.2.1 DIP switch 1 functions”. The minimum sewing speed is the sewing speed when the treadle is at the low-speed sewing position.

7.4 Control box DIP switch setting procedure

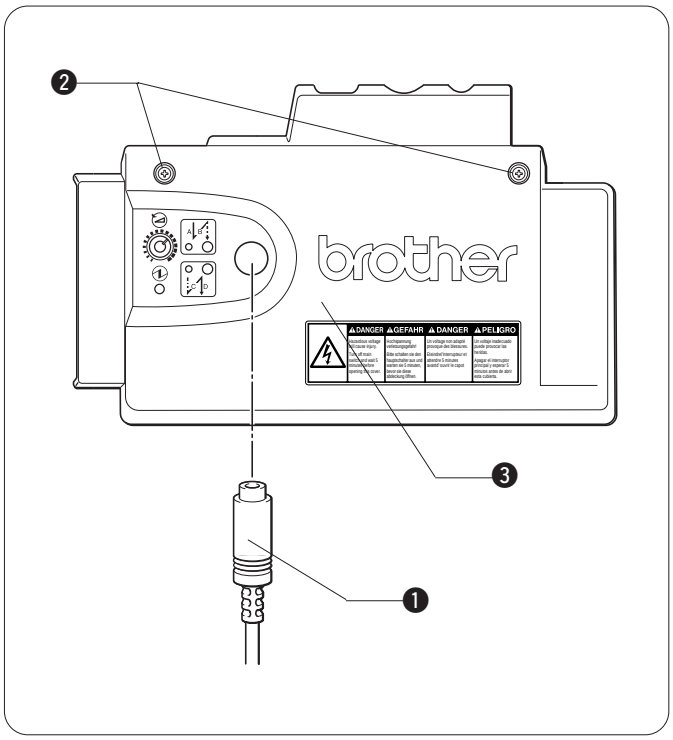
WARNING

Wait at least 5 minutes after turning off the power switch before opening the cover of the control box. Touching areas where high voltages are present can result in severe injury.

CAUTION

Do not clamp the cords inside the control box when closing the control box cover.

- Make sure that the DIP switches are set correctly, otherwise incorrect operation may result.



- Disconnect the synchronizer cord ❶.
- Loosen the two screws ❷, and then gently pull the cover ❸ toward you to open it.
- Set the DIP switches.
  Refer to the tables for details of DIP switch functions.
- Close the cover ❸ (be careful not to clamp the cord) and tighten the two screws ❷.
- Connect the synchronizer cord ❶.

7.5 Description of functions

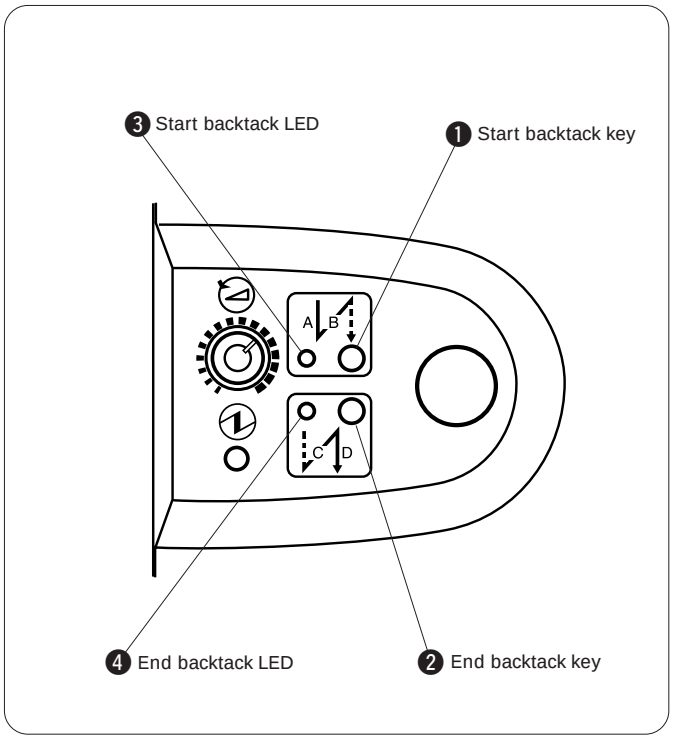
- The control panel is provided with the following functions.

○ · · · Can be used
× · · · Cannot be used

Function	No panel	F-20	F-40	F-100
Maximum sewing speed setting	×	○	○	○
Start backtacking speed setting	×	○	○	○
Needle stop position	○	○	○	○
Automatic thread trimming (thread trimming after Fixed stitch sewing)	×	○	○	○
Slow start	×	○	○	○
Correction sewing	×	○	○	○
Highest needle position stop	×	×	○	○
Start backtacking using control box (N) (2 – 9 stitches)	○	×	×	×
End backtacking using control box (N) (2 – 9 stitches)	○	×	×	×
Start backtacking using panel (N) (0 – 9 stitches)	×	○	○	○
End backtacking using panel (N) (0 – 9 stitches)	×	○	○	○
Start backtacking (V)	×	○	×	×
End backtacking (V)	×	○	×	×
Continuous backtacking	×	×	○	○
Fixed stitch sewing	×	○	○	○
Name label sewing	×	×	○	○
Pleat presser sewing	×	×	○	○
Automatic sewing	×	○	○	○
Continuous sewing (100 stitches or more)	×	×	×	○
Reverse device operation using panel	×	×	×	○
Presser foot lifting operation when stopped using panel	×	×	×	○
Program entry	×	×	×	○

For details, refer to the instruction manual for the respective operation panel.

7.5.1 Backtacking function using the control box when no operation panel is installed



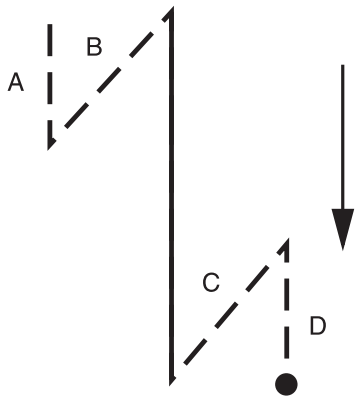
7.5.1.1 Start backtacking function

When the start backtack key ❶ is pressed, the start backtack LED ❸ lights and start backtacking can be carried out.
When the start backtack key ❶ is pressed once more, the start backtack LED ❸ switches off and start backtacking can no longer be carried out.
The start backtack key ❶ can only be used to turn start backtacking on and off after thread trimming is complete.

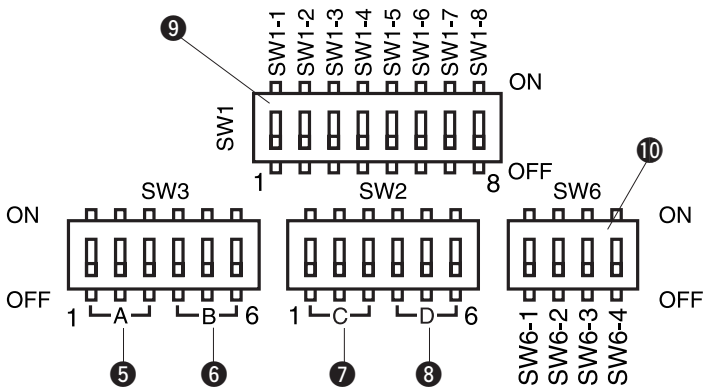
7.5.1.2 End backtacking function

When the end backtack key ❷ is pressed, the end backtack LED ❹ lights and end backtacking can be carried out.
When the end backtack key ❷ is pressed once more, the end backtack LED ❹ switches off and end backtacking can no longer be carried out.
The end backtack key ❷ can be used to turn end backtacking on and off at any time.

7.5.1.3 Setting the number of backtack stitches



Control circuit board DIP switches



Display	A			B			C			D		
DIPSW No.	SW3						SW2					
No. of stitches	1	2	3	4	5	6	1	2	3	4	5	6
2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
4	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
5	ON	ON	OFF	ON	ON	OFF	ON	ON	OFF	ON	ON	OFF
6	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON
7	ON	OFF	ON	ON	OFF	ON	ON	OFF	ON	ON	OFF	ON
8	OFF	ON	ON	OFF	ON	ON	OFF	ON	ON	OFF	ON	ON
9	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON

- Setting the number of start backtack stitches
  Use switches ❺ of DIP switch 3 to set the number of start backtacking stitches A.
  Use switches ❻ of DIP switch 3 to set the number of start backtacking stitches B.
- Setting the number of end backtack stitches
  Use switches ❼ of DIP switch 2 to set the number of end backtacking stitches C.
  Use switches ❽ of DIP switch 2 to set the number of end backtacking stitches D.
  Note:
  At the time of shipment from the factory, DIP switches A, B, C and D are all set to OFF. As a result, the number of stitches is set to 2 for each of A, B, C and D.
  When using an operation panel, backtacking functions using the control box are all disabled.

7.5.2 Other DIP switch functions

7.5.2.1 DIP switch 1 ❾ functions

SW1-1	ON	Presser foot is lowered when treadle is returned to neutral position immediately after thread trimming. (Export specifications)
	OFF	Presser foot is raised when treadle is returned to neutral position immediately after thread trimming. (Domestic Japan specifications)
SW1-2	ON	Motor pulley diameter 90 mm
	OFF	Motor pulley diameter 105 mm
SW1-3	ON	Automatic presser foot lifter device used
	OFF	Automatic presser foot lifter device not used
SW1-4	ON	Stopping position when treadle is at neutral is needle up stop position.
	OFF	Stopping position when treadle is at neutral is needle down stop position.
SW1-5	ON	Twin needle
	OFF	Single needle
SW1-6	ON	Limit speed setting 1
	OFF	
SW1-7	ON	Limit speed setting 2
	OFF	
SW1-8	ON	Limit speed setting 3
	OFF	

Setting for limit speed (sewing machine's maximum sewing speed) ( ) is for overlock machines

Speed (rpm) / DIP switch	1,000 (5,000)	2,000 (5,500)	2,500 (6,000)	3,000 (6,500)	3,500 (7,000)	4,000 (7,500)	4,500 (8,000)	4,700 (8,500)
SW1-6	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW1-7	OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW1-8	OFF	OFF	OFF	OFF	ON	ON	ON	ON
Pulley diameter	105 mm for single-needle machines and overlock machines (90 mm for twin-needle machines)							

Note:
When an operation panel has been connected, the operation panel setting has priority, regardless of the setting for DIP switch 1-4.
Only the maximum sewing speed can be changed using the DIP switch 1-5 setting.
Refer to "7.5.2.2 DIP switch 6 ❿ functions" on this page for other speed selection settings.

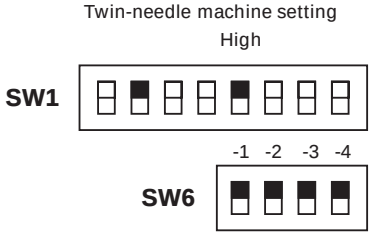
7.5.2.2 DIP switch 6 ❿ functions

DIP switch			Setting speed
SW6-1	Low speed (inching speed)	ON	250 rpm
		OFF	215 rpm
SW6-2	Thread trimming speed	ON	185 rpm
		OFF	215 rpm
SW6-3	Backtacking speed	ON	1,000 rpm
		OFF	1,800 rpm
SW6-4	Improved stopping speed	ON	1,500 rpm
		OFF	1,700 rpm

Note:
DIP switches 1 – 2, 1 – 5 and 6 (1 – 4) are set to match the optimum sewing speed for the machine head, and so should not be changed.
If using the motor after changing over the machine head, check that the above settings match the specifications of the machine head.

Single-needle machine and overlock machines setting

Twin-needle machine setting



7.6 Periodic checks

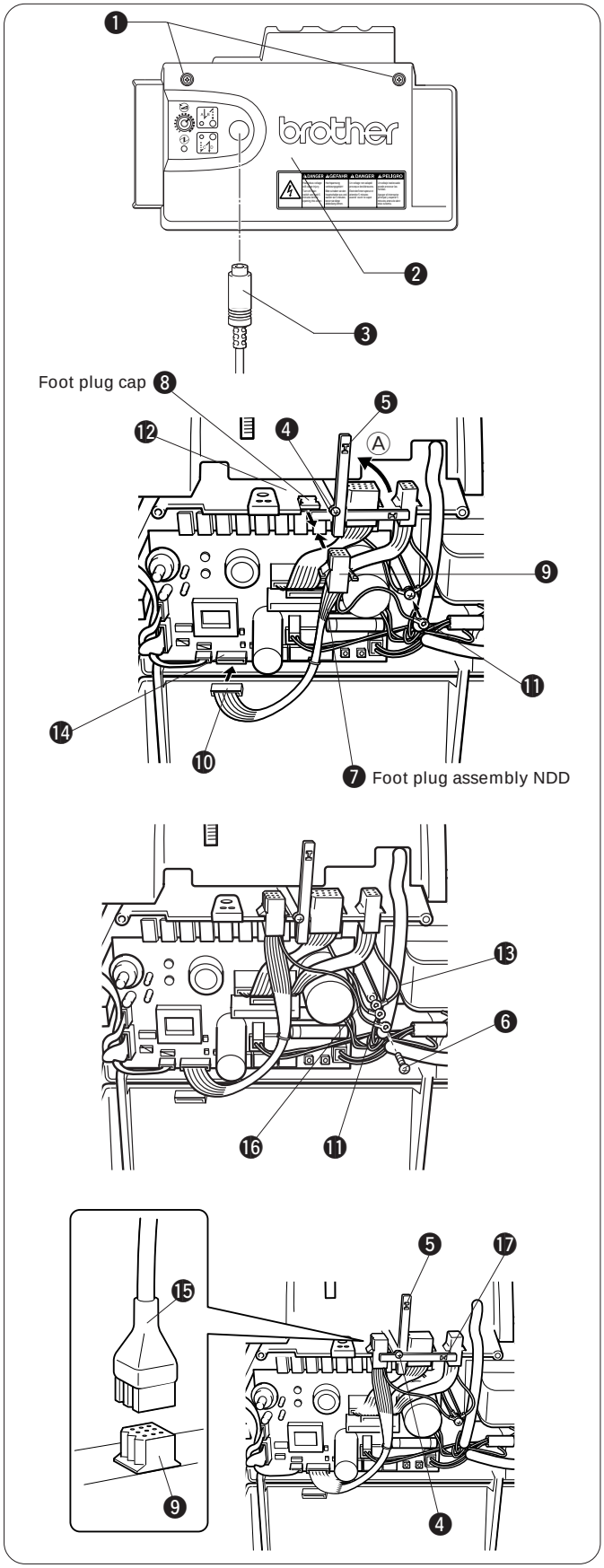
- Clean the dust out of the dust cover at periodic intervals. If the dust cover becomes blocked, there is the danger that the motor may overheat.
- If not using the motor for long periods, turn off the power and disconnect the motor from the power supply.

8. Connecting options

The options include the operation panel, pedal for standing operation and the material edge sensor. Refer to “5.8 Connecting the external operation panel” for the operation panel connection methods. Refer to each respective instruction manual for details on the options.

8.1 Connecting the pedal for standing operations

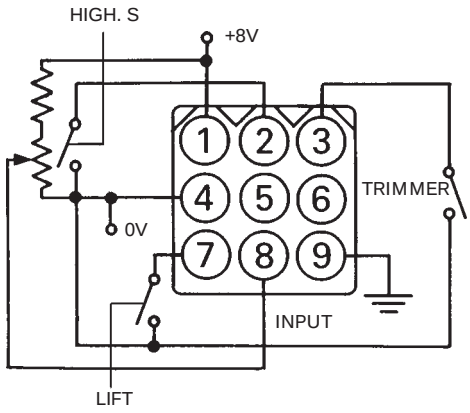
- A variable-speed pedal (J80081-040 or J80380-040) or a two speed pedal (J80630-001) can be connected.



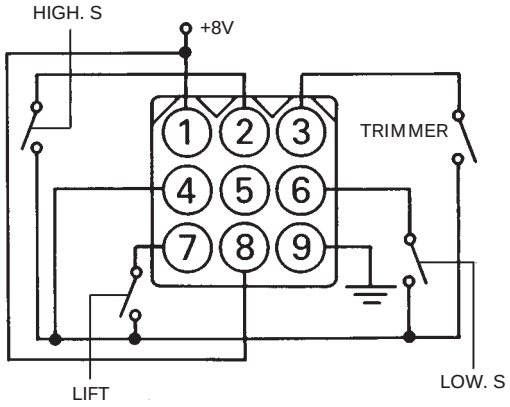
1. Disconnect the synchronizer cord ❸.
2. Loosen the two screws ❶ (do not remove it), and then gently pull the cover ❷ toward you to open it.
3. Loosen the screw ❹ (do not remove it), and then turn the connector presser plate ❺ approximately 90° around the axis of the screw ❹ in the direction of the arrow Ⓐ in the illustration.
4. Pull the foot plug cap ❽ toward you to remove it.
5. Insert the 9-pin connector ❾ of the foot plug assembly NDD (J02824-001) ❼ into the connector mounting base ⓬ from the front, so that the grounding cord terminal ⓫ is on the right side.
6. Insert the foot plug assembly ❼ as shown in the illustration, and then securely insert the 7-pin connector ⓾ of the circuit board into the 7-pin connector ⓮ of the control circuit board.
7. Remove the grounding screw ❻, and then secure the grounding cord terminal ⓫ together with the other grounding cord terminals ⓭ and ⓰ by re-tightening the grounding screw ❻.
8. Return the connector presser plate ❺ to its original position, fit it into the notch ⓱ to prevent it from turning, and then securely tighten the screw ❹.
9. Securely insert the 9-pin connector ⓯ for the standing pedal into the 9-pin connector ❾.
10. Close the cover ❷ (be careful not to clamp the cord) and tighten the two screws ❶.
11. Connect the synchronizer cord ❸.

- Connector wiring diagram

VARIABLE-SPEED PEDAL



TWO SPEED PEDAL



When the switch for the target function has been turned ON, turn the other OFF.

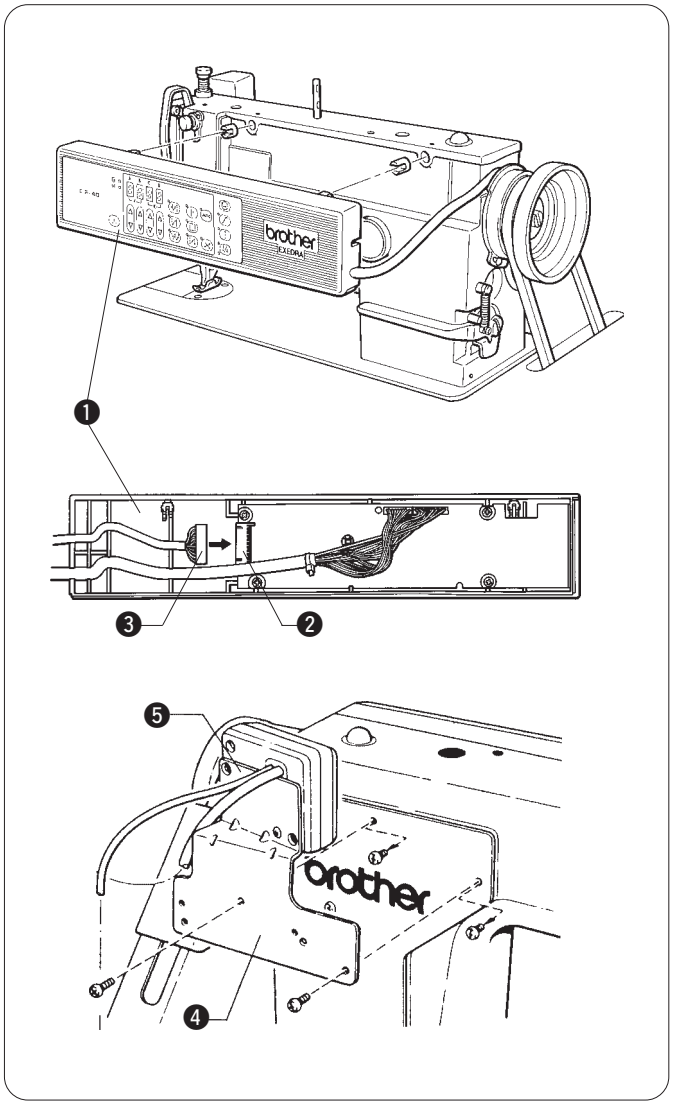
8.2 Connecting the material edge sensor

CAUTION

Turn off the power switch before connecting the cords, otherwise damage to the control box, synchronizer, operation panel or material edge sensor may result.

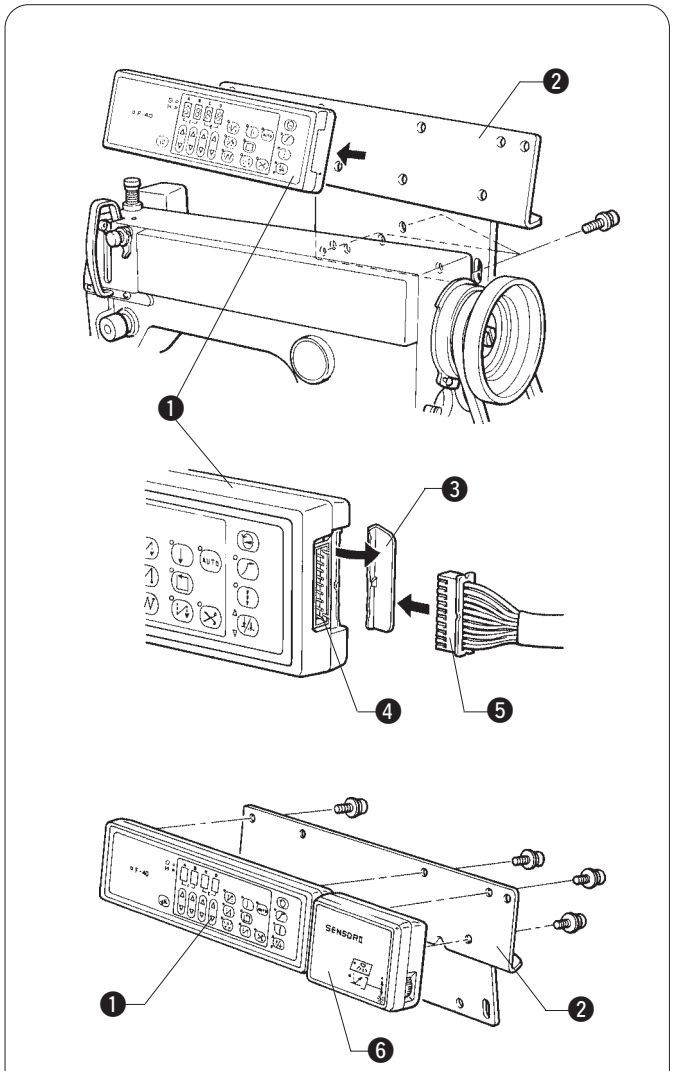
- The sensor II is used for this product.
- Sensor II is used in conjunction with the F-20, F-40 or F-100 operation panel, and cannot be used by itself.
- The sensor II connection method differs according to the operation panel type.

- Built-in type



1. Remove the operation panel ❶ from the machine.
2. Insert the sensor II connector ❸ into connector ❷ in the operation panel.
3. Using a mounting bracket ❹, screw the sensor II ❺ onto the machine.
4. Install the operation panel ❶ onto the machine.

- External type

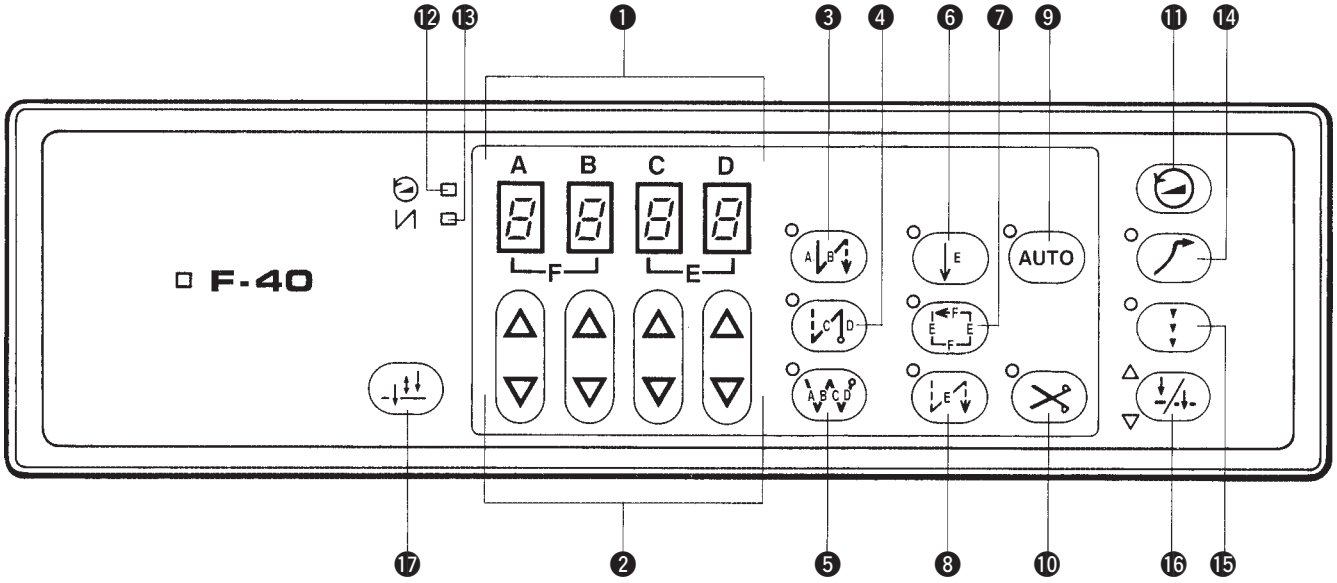


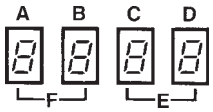
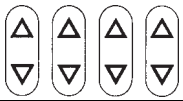
1. Remove the operation panel ❶ from the mounting bracket ❷.
2. Bend the protrusion ❸ on the right side of the operation panel.
3. Insert the sensor II connector ❺ into connector ❹ in the operation panel.
4. Install the sensor II ❻ and operation panel ❶ onto the mounting bracket ❷ as shown in the illustration.

9. Using the operation panel F-40

★ Key operations and the number of stitches set cannot be changed during sewing. Be sure to confirm all key settings and the number of stitches before starting to sew. Note that the end backtacking feature can be set and canceled while sewing.
★ For keys which have an indicator to their left, the indicator will illuminate when the key is pressed once, and will switch off when the key is pressed once more. This operation is repeated each time the key is pressed.
★ To carry out two or more operations simultaneously, press all of the necessary keys so that the respective indicators are illuminated.

Part names and functions



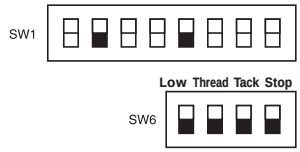
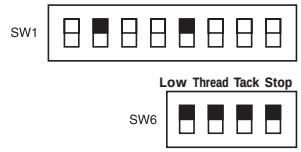
No.	Key name	Function
❶	LED display 	Displays the number of start and end backtack stitches (A, B, C and D), the number of fixed-length stitches (E), the number of label sewing stitches (E and F), the number of pleat presser stitches (E), the sewing speed (A, B, C and D) and the backtack sewing speed (A, B, C and D).
❷	Stitch number setting keys 	These keys are used to set the number of start and end backtack stitches (A, B, C and D), the number of fixed-length stitches (E), the number of label sewing stitches (E and F), the number of pleat presser stitches (E), the sewing speed (A, B, C and D) and the backtack sewing speed (A, B, C and D). Press △ to increase a setting from 0 up to 9. Press ▽ to decrease a setting from 9 down to 0.
❸	Start backtack key	When this key is pressed, the number of start backtack stitches set for A and B (0 – 9) is sewn.
❹	End backtack key	When this key is pressed, the number of end backtack stitches set for C and D (0 – 9) is sewn.
❺	Continuous backtack key	When this key is pressed, the number of stitches set for A, B, C and D (0 – 9) will be sewn as continuous backtack stitches. After the machine finishes sewing one A-B-C-D cycle, the thread is automatically trimmed. The number of start and end backtack stitches can be set independently of each other.

No.	Key name	Function
❻	Fixed stitch key	When this key is pressed, the number of stitches for seam E (01 – 99) is sewn. To sew start backtack stitches at this time, press the start backtack key ❸. The number of start backtack stitches are set by A and B. To sew end backtack stitches at this time, press the end backtack key ❹. The values for C and D become the number of end backtack stitches when fixed stitch sewing is off.
❼	Name label key	When this key is pressed, the number of stitches for seams E and F (01 – 99) will each be sewn twice. To sew start backtack stitches at this time, press the start backtack key ❸. The values for A and B become the number of start backtack stitches when name label sewing is off. To sew end backtack stitches at this time, press the end backtack key ❹. The values for C and D become the number of end backtack stitches when name label sewing is off.
❽	Pleat presser sewing key	When this key is pressed, the number of stitches for seam E (01 – 99) is sewn when the actuator is pressed. To sew start backtack stitches at this time, press the start backtack key ❸. The number of start backtack stitches are set by A and B. To sew end backtack stitches at this time, press the end backtack key ❹. The values for C and D become the number of end backtack stitches when pleat presser sewing is off.
❾	AUTO key	When this key is pressed, machine operations (start backtack sewing, end backtack sewing, fixed stitch sewing and thread trimming) will be automatically carried out up until the set position when the treadle is depressed. This key is only valid when the continuous backtack key ❺, fixed stitch key ❻ or name label key ❼ has been pressed.
❿	Thread trimming key	When this key is pressed, the thread is trimmed after sewing is completed. This key is only valid when the fixed stitch key ❻ or name label key ❼ has been pressed.
⓫	Sewing speed key	When this key is pressed, the sewing speed indicator ⓬ will illuminate and the sewing speed will be shown in the LED display ❶. You can then set the sewing speed by setting the respective values for A, B, C and D. If this key is then pressed again, the backtack indicator ⓭ will illuminate and the backtack sewing speed will be shown in the LED display ❶. You can then set the sewing speed by setting the respective values for A, B, C and D. If this key is then pressed again or if the machine is started, the LED display ❶, sewing speed indicator ⓬ and backtack indicator ⓭ will all switch off.
⓬	Sewing speed indicator	
⓭	Backtack indicator	
⓮	Slow start key	When this key is pressed, the first two stitches at the sewing start (after the thread has been trimmed and the needle has been raised) are sewn at low speed.
⓯	Correction key	When set to ON, correction sewing is carried out at low speed when the quick reverse switch is pressed. This function cannot be used after thread trimming. If the quick reverse switch is pressed while the sewing machine is operating, reverse feed will be carried out.
⓰	Needle up/down key	The " △ " and " ▽ " indicators illuminate each time this key is pressed. If the treadle is pressed to the neutral position while the " △ " indicator is illuminated, the needle will rise above the needle plate and stop (needle up stop). If the treadle is pressed to the neutral position while the " ▽ " indicator is illuminated, the needle will drop below the needle plate and stop (needle down stop).
⓱	Half stitch key	This key is used to raise or lower the needle when machine operation is interrupted.

10. Changing the head settings

When using a motor for a different head than the default head, change the settings with the following procedures.
(Note) The operation panel F-40 or F-100 is required.

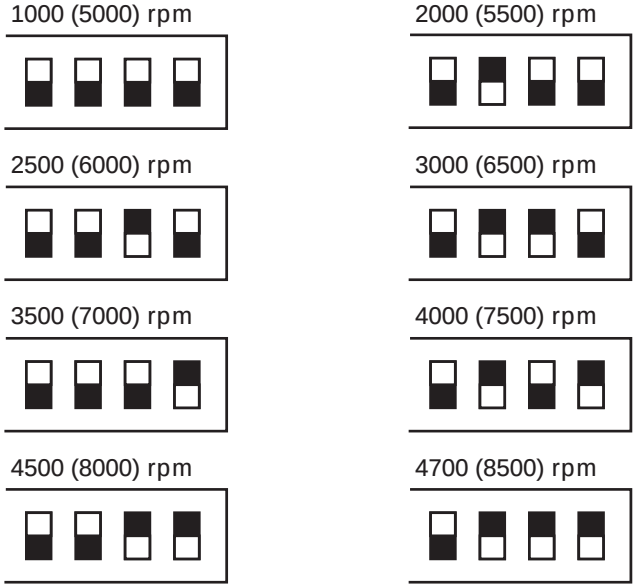
10.1 Setting the motor pulley size and DIP switches for the head

Head	Pulley size	SW1, SW6 settings
• Single needle lockstitch machine B737, (B201) B791, B774, B722, B724, B748A, B798, B728, B772A, B778A, B781, B852, B853, B854, B883 • Overlock	ϕ 105	
• Twin needle lockstitch machine B842, B872, B845, B875, B847, B848, B837, B877, B878 • Post-type sewing machine P73, P81, C51	ϕ 90	

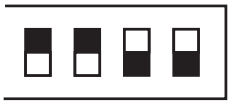
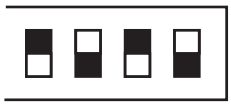
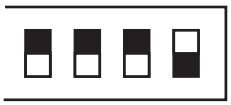
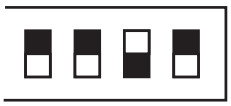
(Note) If the SW1-2, 5 or SW6-1, 2, 3, 4 settings are changed, the control box head setting will change to “7373” (SW1-5: OFF) or “8423” (SW1-5: ON).

10.2 Setting the DIP switch maximum speed setting for the head

Single needle sewing machine (SW1-5 = OFF)

Head	High speed	DIP switch (SW1-6, 7, 8) setting
B737-3 B737-5 B737-1	4700 3500 4000	Set 850 rpm to 1000 rpm. (Values given in parentheses are the overlock rotation speeds.) 
B791-3 B791-5	4500 3500	
B774-3 B774-5	4500 3500	
B722-3 B722-5	4700 4000	
B724-5	4000	
B748-5 B748-7	4000 3000	
B798	2000	
B772	4700	
B778	4700	
B781	4000	
B852	4500	
B883	850	
ovL	6000 8000	

Twin needle sewing machine (SW1-5 = ON)

Head	High speed	DIP switch (SW1-6, 7, 8) setting
B842-3 B842-5 B842-1	4000 3500 4000	Set 2200 rpm and 2400 rpm to 2500 rpm. Set 2600 rpm to 3000 rpm. 1000 rpm 2000 rpm  2500 rpm  3000 rpm  3500 rpm 4000 rpm 
B872	3000	
B845	3000	
B847	4000	
B848	3000	
B837	3000	
B877	3000	
B878	2500	
P73/P81	2200 2400 2600	
C51	2200 2400 2600	

(Note) If the SW1-2, 5 or SW6-1, 2, 3, 4 settings are changed, the control box head setting will change to “7373” (SW1-5: OFF) or “8423” (SW1-5: ON).

10.3 Setting the control box head setting for the head

The head must be set except for the B737 (B201) and B842.

(Note) Only the maximum speed is set for the control box head setting. Note that the SW1-6, 7, 8 settings will have the priority.

10.3.1 Setting procedure

① Before turning on the power, check that the motor pulley diameter matches the machine head.
② Check the settings for DIP switch 1-2 (pulley size) and whether DIP switch 1-5 is set to single needle machines (overlock machines) or twin needle machines.
③ Change to machine head setting mode.
While pressing the sewing speed key , turn on the power switch. [****] will appear in the ABCD display.
([****] represents the previous setting value.)
④ Set the machine head.
1) Meaning of display
The machine head model appears in the ABC columns, and the sub-class appears in the D column.
2) Setting method
a) Press the B [Δ] · [∇] key to set the machine head model.
b) For the D column display, press the D [Δ] · [∇] key to set the sub-class.
c) Press the **[ ]** key to end the setting and store the setting value.

10.3.2 Initializing the machine head setting value

1) When chaning the setting for DIP switches 1-2, 1-5 or 6
Initial value: [7373] when switch 1-5 is OFF (single needle)
[8423] when switch 1-5 is ON (twin needle)

10.4 Setting the control box speed setting for the head

Change the speed setting for the following head settings highlighted in gray.

(1) Single needle

Head	Inching speed [Lo]	Thread trimming speed [tr]	Slow speed [SL]	Start backtacking speed [Li]	End backtacking speed [Eb]	Improved stopping [Po]
B737/B201/B755	215	215	215	1800	1800	1700
B791	215	215	215	1800	1800	1700
B774	215	215	215	1800	1800	1700
B722	215	215	215	1800	1800	1700
B724	215	215	500	1600	1600	1700
B748	215	215	215	1200	1200	1700
B798/728	215	215	215	1000	1000	1700
B722A	215	215	215	1800	1800	1700
B778A	215	215	215	1800	1800	1700
B781	215	215	215	1800	1800	1700
B852/853/854	215	185	215	1200	1200	1700
B883	250	170	250	250	250	500
Overlock	215	215	215	1800	1800	1500

(2) Twin needle

Head	Inching speed [Lo]	Thread trimming speed [tr]	Slow speed [SL]	Start backtacking speed [Li]	End backtacking speed [Eb]	Improved stopping [Po]
B842	250	185	250	1000	1000	1500
B872	250	185	250	1000	1000	1500
B845/875	250	185	250	1000	1000	1500
B847	250	185	250	1000	1000	1500
B848	250	185	250	1000	1000	1500
B837	250	185	250	1000	1000	1500
B877	250	185	250	800	800	1500
B878	250	185	250	800	800	1500
P73/P81	250	185	250	1000	1000	1500
C51	250	185	250	1000	1000	1500

10.4.1 Setting procedure

① Turn on the power switch and clear the [ABCD] display.
② Press the **[AUTO]** key and the **[ ]** key at the same time. [dS] appears in the display.
③ Press the **[AUTO]** key and the **[ ]** key at the same time. [SP] appears in the display.
④ Press the **[ ]** key to change the type of speed displayed.
⑤ Press the B [Δ] key until the speed to be changed appears.
⑥ Press the **[ ]** key to display the current speed setting.
⑦ Set the speed to match the machine head. Use the [Δ] and [∇] keys to set the speed.
⑧ Press the **[ ]** key to return to the speed display.
⑨ Press the B [Δ] key until [En] is displayed.
⑩ When [En] appears, press the **[ ]** key.
⑪ Repeat steps ⑨ and ⑩ until the display disappears to end the procedure.

Note:
- If you would like to set the maximum sewing speed and the start backtacking speed to be lower than the speed which has been set by DIP switch 1 or the speed set in speed setting mode [SP]
  The speed can be changed easily using the sewing speed key on the operation panel.
- The automatic sewing speed can only be set to be lower than the maximum sewing speed.

11. Changing the function settings

The function settings can be changed by changing the memory switch settings.
The operation timing, etc., can be changed by changing the parameter settings.

(Note) Operation panel F-40 or F-100 is required.

11.1 Example for changing the memory switch setting

11.1.1 When sewing thick materials, the needle may contact the material after thread trimming making it difficult to remove the stitched product. Thus, the setting is changed so lift the needle with reverse run after trimming the thread. (Set memory switch [61] to ON.)

1) Turn on the power switch, and erase the [ABCD] display. (When using F-100, set to pattern 1).
2) While pressing the **[AUTO]** key, press the **[✂]** key. [dS] will appear at the [AB] display.
3) Press the **[✂]** key. The first display will be [11-0] (OFF) or [11-1] (ON).
4) Set the memory switch No. to [61] using the **[**A, B+/–**]** keys. (The default setting is [61-0] (OFF).)
5) Press the **[**D+**]** key, and turn memory switch [61] ON. ([61-1] (ON))
6) Using the **[**A+/–**]** key, set the [AB] display to [En], and then press the **[✂]** key. [dS] will reappear.
7) Using the **[**B+**]** key, set the [AB] display to [En], and then press the **[✂]** key. The [ABCD] display will disappear, and the setting will be completed.

11.1.2 If you would like better matching for backtacking, this momentarily pauses feed at the corners so that the backtack seams match. (Set memory switch [68] is turned ON.)

1) Turn on the power switch, and erase the [ABCD] display. (When using F-100, set to pattern 1).
2) While pressing the **[AUTO]** key, press the **[✂]** key. [dS] will appear at the [AB] display.
3) Press the **[✂]** key. The first display will be [11-0] (OFF) or [11-1] (ON).
4) Set the memory switch No. to [68] using the **[**A, B+/–**]** keys. (The default setting is [68-0] (OFF).)
5) Press the **[**D+**]** key, and turn memory switch [68] ON. ([68-1] (ON))
6) Using the **[**A+/–**]** key, set the [AB] display to [En], and then press the **[✂]** key. [dS] will reappear.
7) Using the **[**B+**]** key, set the [AB] display to [En], and then press the **[✂]** key. The [ABCD] display will disappear, and the setting will be completed.

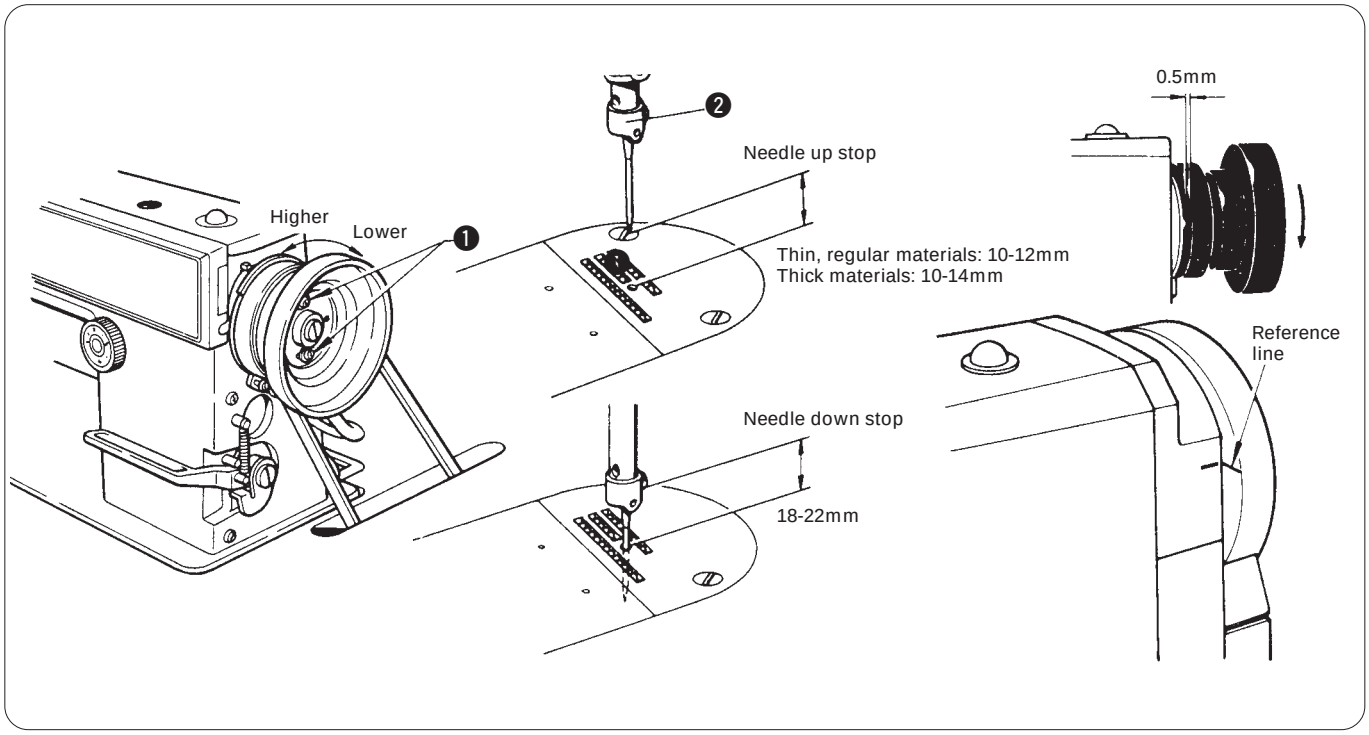
11.2 Example for changing the parameter settings

11.2.1 If flickering of the fluorescent light is annoying when starting the motor, delay the motor startup and reduce the power voltage fluctuation to reduce the fluorescent light flicker. (Change parameter [n6] from 10 to 30.)

1) Turn on the power switch, and erase the [ABCD] display. (When using F-100, set to pattern 1).
2) While pressing the **[AUTO]** key, press the **[✂]** key. [dS] will appear at the [AB] display.
3) Press the **[**B+**]** key. [PA] will appear at the [AB] display.
   If [PA--] appears at the [AB] display, press the **[**B+**]** key twice, and return to the [dS] display. Then set the memory switch [01] ON.
4) If [PA] is displayed at the [AB] display, press the **[✂]** key. The first display will be [t002]. (Default setting value.)
5) Repeatedly press the **[**B-**]** key, and set the [AB] display to [n6]. ([n6 10] (default setting))
6) Using the **[**CD+/–**]** key, set the parameter value to 30. ([n630])
7) Press the **[**B+**]** key several times, set the [AB] display to [En], and then press the **[✂]** key. The [AB] display will return to [PA]. ([PA])
8) Using the **[**B+**]** key, set the [AB] display to [En], and then press the **[✂]** key. The [ABCD] display will disappear, and the setting will be completed.

12. Adjustments

12.1 Synchronizer Model DB2-B737·B748·B774·B791



★ The synchronizer detects the needle position with two sensors.
The thread trimming signal is timed to the needle down position signal and the treadle reverse signal.
★ When the power is turned on and the needle stopped in the down position, the distance between needle plate top and needle set screw bottom should be 18 to 22mm.
When the needle is stopped in the up position and the pulley reference line is within the belt cover reference lines, the distance between needle plate top and needle tip should be 10 to 12mm with thin and regular materials, 10 to 14mm with thick materials. (With Model B748 the needle up stop position is 10-14mm.)
Adjust as follows when necessary.
★ Turn the power off.

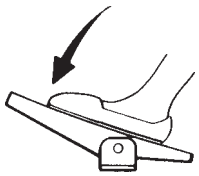
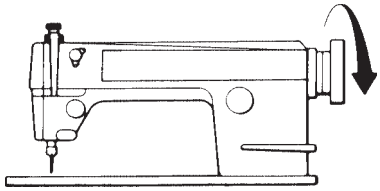
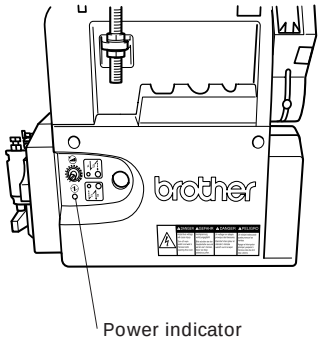
Needle up position
1. Slightly loosen the two screws ❶.
Move the set screws ❶ in the direction of normal pulley movement to raise the needle bar ❷ stop position. Turn the other way to lower the needle bar.

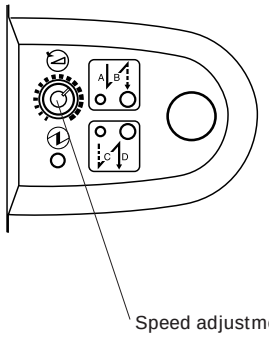
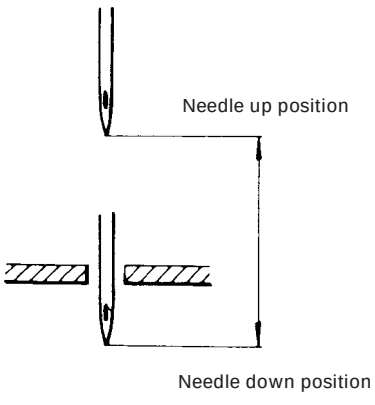
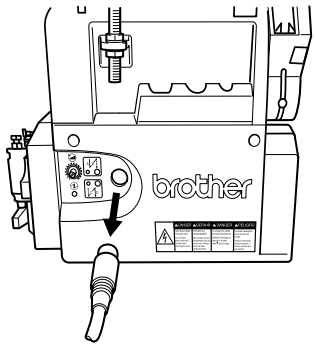
Needle down position
1. Set the treadle to reverse and then release it to neutral. (This is the needle down stop position.)
2. The distance between the needle plate top and the needle screw bottom should be 18-22mm.
3. Loosen screw ❸ and move the synchronizer ❹ to adjust.
* Check the needle up stop position.
* When the machine pulley is removed once, provide 0.5mm clearance between the pulley bottom and the synchronizer for installation.
(Improper clearance causes improper machine operation.)

When the synchronizer is out of order...
★ Turn off the power switch and disconnect the synchronizer cord.
Use the machine with standard function (without thread trimming) until the synchronizer is replaced.

13. Troubleshooting guide

- If there seems to be a malfunction, first check the machine as described below. If the problem remains unresolved, turn off the power and contact your nearest Brother dealer.
  When using a model with the operation panel if an error displays on the operation panel refer to “13.1 Error display and details”.

Problem	Where to check (after turning off the power)
1. The motor will not operate even though the power is on and the treadle is depressed.  	(1) The power indicator (green LED) is not illuminated.  → Check the main power voltage. (Try connecting the power cord to a different outlet.) → Check for a blown 8A fuse. FU will flicker when using the operation panel. (The control box is defective so replace it.) (2) The power indicator (green LED) is illuminated. → Is the treadle pressed down? • The treadle must be returned to the neutral position once after the power is turned on before operation can be started. → Turn the machine pulley lightly by hand. If it is heavy or does not rotate, check the machine or motor.

Problem	Where to check (after turning off the power)
2. The machine will not operate at high speeds.	(1) Check if the speed adjustment knob has been turned counterclockwise. 
	(2) The machine pulley does not turn easily. → Remove the belt from the machine pulley and check the torque.
	(3) The motor pulley is incorrect. → Check that the size of the motor pulley being used matches the machine.
	(4) The DIP switch settings are incorrect. → Check that the DIP switch settings are adequate. Refer to “7.5.2 Other DIP switch functions”. If the pulley used and the DIP switch settings differ, the motor may continue to rotate when stopping from a high speed.
3. The machine stops while sewing.	Voltage drop → Check the power voltage. (Even if the measured voltage is normal, if the wiring is too long or if branched wiring is used, the voltage may drop during sewing causing the reset function to activate and the machine to stop.)
	Occurrence of various errors → Refer to “13.1 Error display and details”.
4. The machine does not stop in the needle down or needle up position after the treadle is returned to the neutral position.  	Turn off the power switch, disconnect the synchronizer cord, and then turn the power switch back on. If the sewing machine stops when the treadle is at the neutral position, there is a problem with the synchronizer. → Replace the synchronizer. If the sewing machine does not stop, there is a problem with the control box. → Replace the control box. 

13.1 Error display and details

If an error occurs, an error code, etc., will display on the counter section of the operation panel.
If the error display flickers, check the contents, turn the power switch OFF and remove the cause. Then, turn the power ON again.

Display	Details	Where to check (after turning off the power)
Pt	Control box overheating, overcurrent, momentary failure of power supply	Is the load abnormally high?
ou	Power voltage too high	Check the power voltage. The momentary power voltage may increase when the factory's breaker trips, etc.
oL	Load is too large	This error may occur during deceleration if the load inertia is too large.
Lo	Motor or machine lock, synchronizer fault	Lightly rotate the machine pulley by hand and confirm that it turns. Check the details for the synchronizer in section 4 of the troubleshooting section.
FU	8A fuse for solenoid blown Transformer error	Open the cover, and check the 8A fuse on the circuit board.
Pd	Momentary drop or failure of power supply	Check the power voltage. If the wiring is too long or if it is branched, the voltage may drop momentarily during starting.
E0	Operation panel switch error (switch is always on)	Replace the operation panel.
E 1	Operation panel connection error	Check the operation panel connectors for disconnections or looseness. The operation panel may be faulty.
PU	Pulley setting and actual pulley differ.	Set the DIP switches according to the machine head and pulley being used. (Refer to "7.5.2 Other DIP switch functions".)
ot	Time overrun	If the sewing machine has been running continuously for 3 minutes, it is stopped as a safety measure.
All displays flash.	Control circuit board memory element is faulty.	Replace the control box or control circuit board.

13.2 Control box troubleshooting guide

Power PCB

PROBLEM	CHECK	PROBABLE CAUSE	REMEDY
When power SW is ON, LED (Red) does not illuminate.	Fuse F101, F102 blown?	Short circuit of the load on the power circuit. Something wrong with BD101? IPM? ZR? C101–C103, C111–C113? Power transformer?	Do not switch ON unless short circuit is solved.
	Fuse F101, F102 OK?	Has the R101 broken down? Has the pattern blown?	Replace the R101 Replace power PCB
While running the motor OV or OL error sign appears.	CNR (40W/100ohm broken down?) F201 (2A fuse) blown?	40W/100ohm broken down? iGBT broken down?	Replace 40W/100ohm Replace fuse, iGBT
	OL error?	Pressed the pedal so hard?	Educate how to press the pedal
Motor does not run smoothly and an error sign PT appears, sometimes.	Malfunction by noise coming from outside. Malfunction by static electricity	Is earth surely taken for the power supply? Is earth taken for the sewing head and box? Is earth good for motor and box?	Take earth Take earth
While running, PT appears.	Operation of IPM	Something wrong with IPM, PHU-PHW	Replace the power PCB
Motor does not run smoothly.	Wirewould resistance of motor. Operation of PHU-PHZ Operation of IPM	Measure wirewould resistance. 2.6ohm between each phases? Check IPM operation.	Replace motor Replace power PCB
Motor start up is not good and motor does not rise in its rotation. Or, the power relay becomes OFF.	Is power relay ON? Heating of the R101 resistor?	Is the contact point of power relay open? When the power switch is ON, the contact point is closed. Is R101 resistor broken?	Replace relay (RY). The lead wire of relay is broken. Replace R101

Treadle unit

Motor does not start when pressing the pedal	Is VC voltage right at pedal neutral position?	Is there about 1.5V?	Adjust by VR1
	VC voltage when pedal is pressed fully forward	Is there about 4.5V?	Adjust by VR2
	VC voltage does not change?	Something wrong with #1? HO?	Replace #1, HO.

Synchronizer

While running an error sign Lo appears.	Remove synchronizer cord and check operation. Machine and motor run	No encoder signal, needle-up signal, needle-down signal.	Replace synchronizer
	Remove synchronizer cord and check operation. No running of machine and motor	Motor is locked.	Motor
		Sewing head is locked.	Adjust sewing head
		Others	Control PCB?
Motor does not run smoothly. Motor rotate by doing inching.	Remove synchronizer cord and check It rotate smoothly	Something is wrong with the encoder signals.	Replace synchronizer
	It does not rotate smoothly.	Motor is broken down or resistance value abnormal	Motor
		Others	Control PCB

Control PCB

When power is ON, an error sign FU appears.	8A fuse blown? 8A fuse OK?	Check transistor for solenoid Check power transformer	Replace fuse
Something is wrong with the operation of sewing head and motor.			Replace control PCB

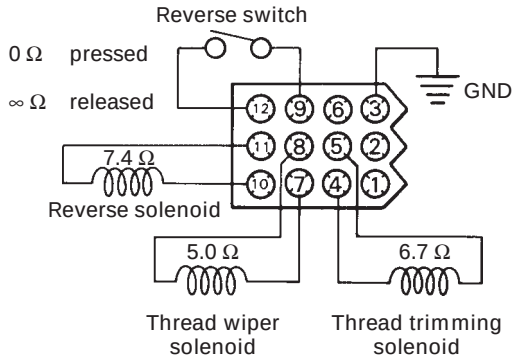
Power transformer

When power SW is ON, LED (Red) does not illuminate.	Fuse F101, F102 blown?	Check resistance value at the primary side of transformer. Is there about 15ohm? Check BD101.	Replace transformer Replace BD101

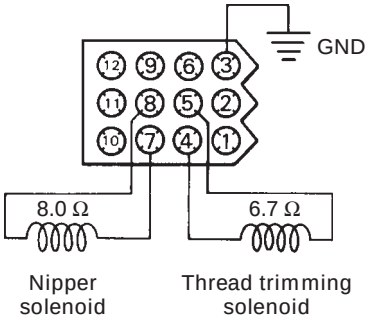
13.3 Checking the machine solenoids

1. Remove the load connector (12P connector) of the machine from the connector part of the control box.
2. Measure with the tester set in the resistance range × 1 as follows.

Connector from the machine head

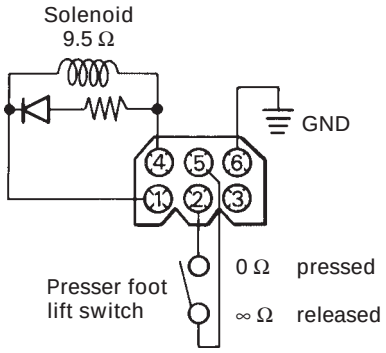


(B737)



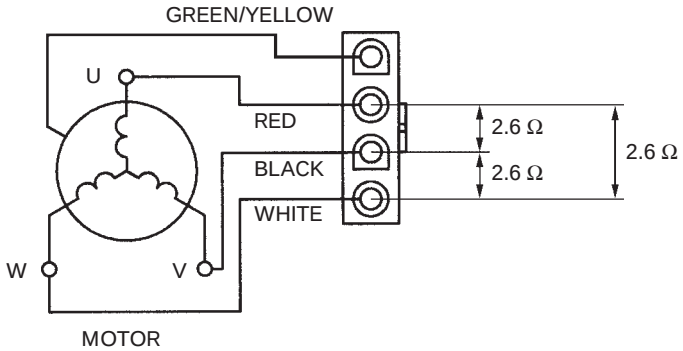
(B883)

Presser foot lift connecter



13.4 Checking the motor

1. Remove the motor cord (4P connector) from the connector part of the power board.
2. Measure with the tester set in the resistance range × 1 as follows.



14. VR1 & VR2 setting of treadle unit

PS-INV Assy (MD-602, 612)

After changing this circuit board. Please adjust the volume (VR1, VR2) since we suppose that the voltage of each position may change due to the aberration of position of magnet and hole element when you set this circuit board onto the treadle base.

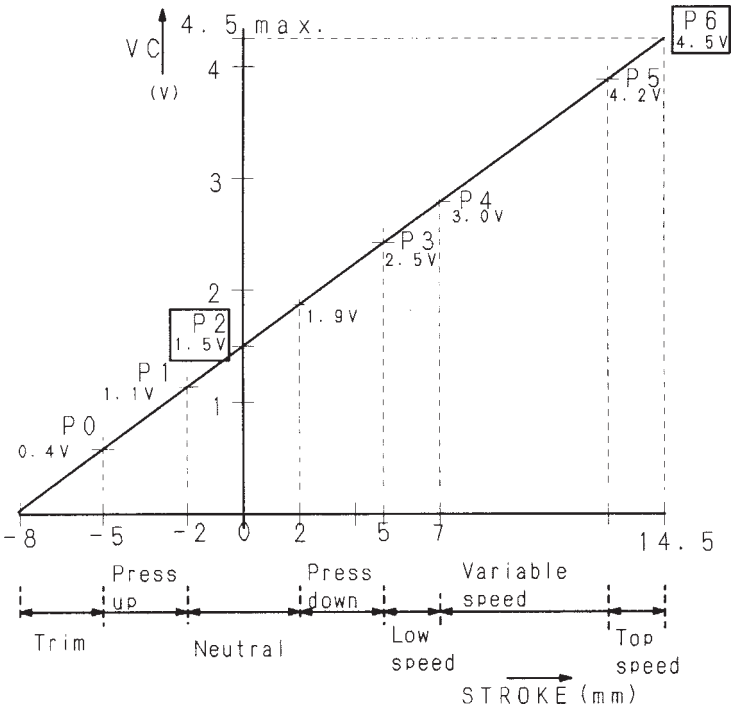
Points of adjustment;
Please adjust the position of P2 with VR1 and the position of P6 with VR2.
- Adjustment of the position of P2 means that the pedal-lever should be the neutral position.
- Adjustment of the position of P6 means that the pedal-lever should be the position of full with forward stepping operation.

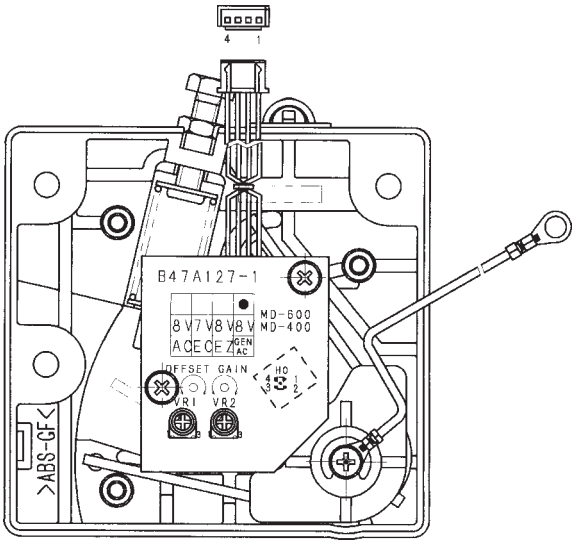
	DC-voltage	DISPLAY OF OPERATION PANEL	TYPICAL
PEDAL-LEVER NEUTRAL (P2)	DC1.4 – 1.6V	14 – 16	1.5V
PEDAL-LEVER FULL (P6)	DC4.5 – 4.7V	45 – 47	4.6V

There are two adjusting ways as follows.
1. Please indicate the voltage after indicating (A3) in 7-segment display in (CP) check mode.
   (1) **[AUTO]** + **[✂]** [dS]
   (2) **[⇅]** + **[AUTO]** [SP]
   (3) **[Δ]** of B [CP] Input/output check mode
   (4) **[✂]** [A3□□] HEXA
   (5) **[⇅]** [A3□□] DECMAL

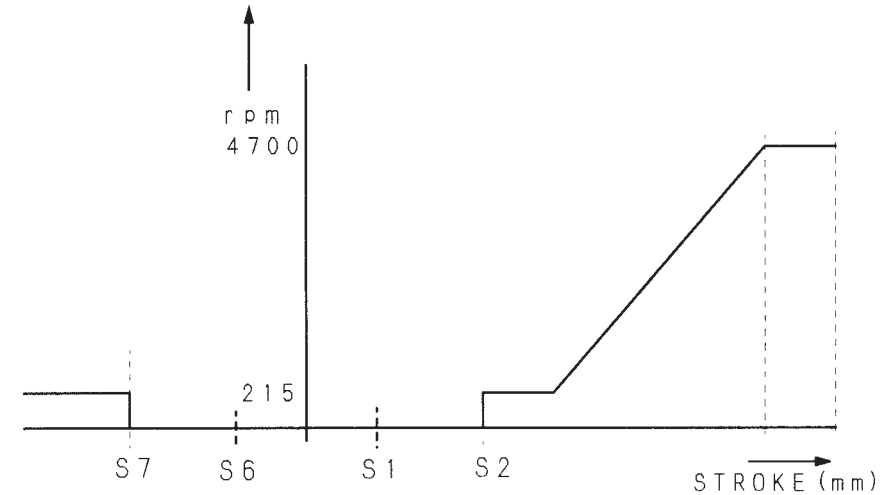
   Then please adjust to display 14 – 16 in the neutral position, if you turn VR1 in clock-wise the value goes down.
   Please adjust VR2 to display 45 – 47 in the full step position of pedal, if you turn VR2 in clock-wise the value goes up.
   Please adjust VR1, VR2 repeadly to locate the value within the above each limit.
2. Please measure the DC-voltage with the tester to put + pole to connecter No.2 and – pole to connecter No.3 and then adjust VR1 and VR2 to locate the volume within the above each limit.

Stroke – VC (analog voltage) Chart





Stroke – rpm chart



S1 pres. down pos
S2 front pos
S6 pres. up pos
S7 trim. pos

15. Explanation of each mode

Besides the normal stitching mode, the head setting mode, initialization mode, and memory switch setting mode, etc., can be entered using the operation panel and various settings can be made. (If the power switch is turned ON while holding down the designated key, the initialization and head setting modes can be entered. If the designated key is pressed while the thread trimming needle is stopped at the UP position in the stitching mode, the memory switch setting mode, etc., can be entered.)

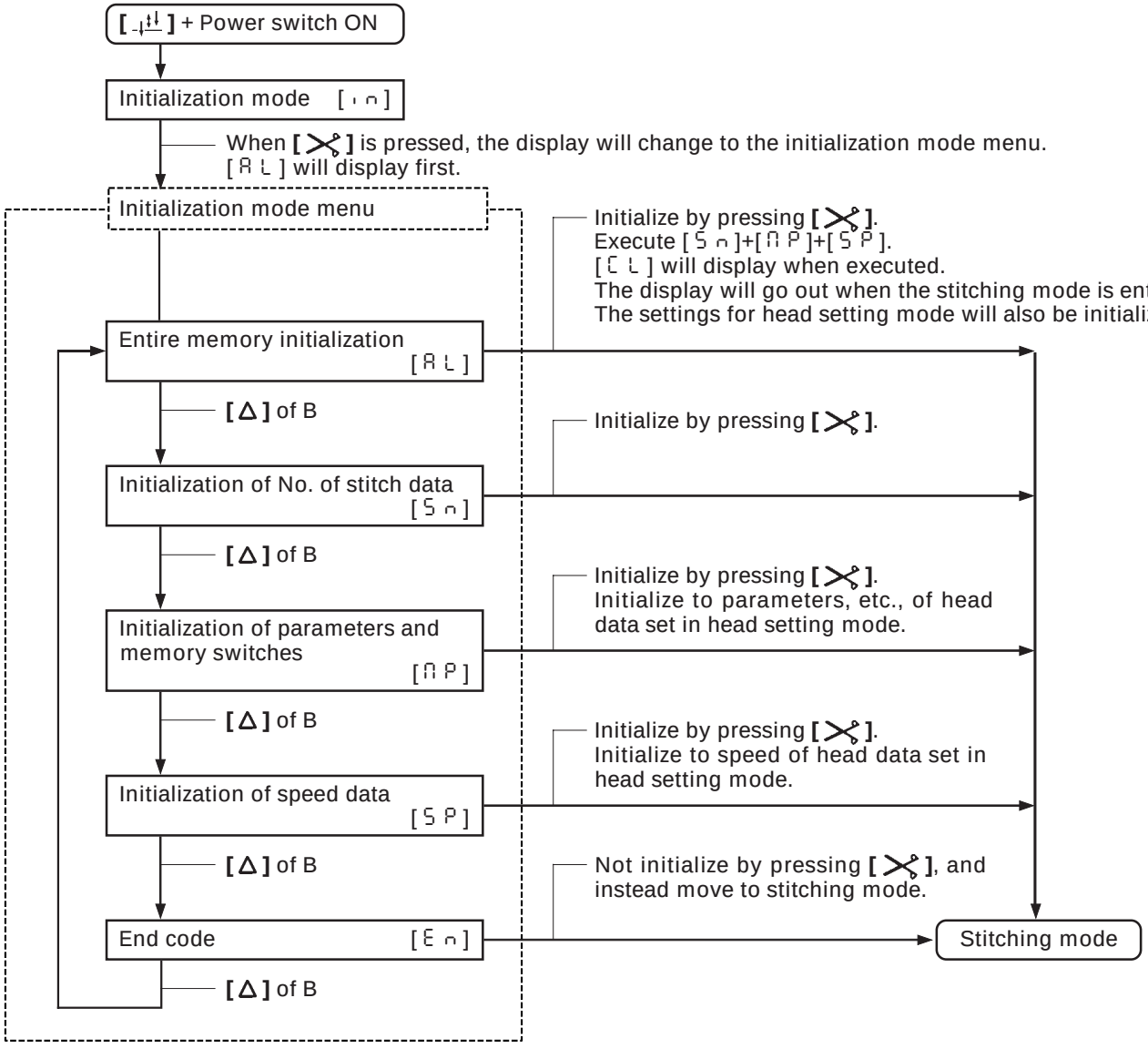
(Note) This function can be used only when the F-40 or F-100 operation panel is connected. **This cannot be used with the F-20 panel.** Once the settings are made with the F-40 or F-100 operation panel connected, the set details will be registered even if the panel is disconnected.

Explanation of flow chart [□□]... Indicates the display.
[□□]... Indicates a key operation.
\+ ... Indicates simultaneous double operation.

15.1 Initialization mode

Various data can be registered in the memory on the control PCB, and can be changed as required. If the data is changed by mistake, the data can be initialized with the initialization mode.

(Note) Only this function can be used with the F-20 panel.


[ ] + Power switch ON
Initialization mode [ ]
When [ ] is pressed, the display will change to the initialization mode menu.
[ ] will display first.
Initialization mode menu
Initialize by pressing [ ].
Execute [ ]+[ ]+[ ].
[ ] will display when executed.
The display will go out when the stitching mode is entered.
The settings for head setting mode will also be initialized.
Entire memory initialization [ ]
[Δ] of B
Initialize by pressing [ ].
Initialization of No. of stitch data [ ]
[Δ] of B
Initialize by pressing [ ].
Initialize to parameters, etc., of head data set in head setting mode.
Initialization of parameters and memory switches [ ]
[Δ] of B
Initialize by pressing [ ].
Initialize to speed of head data set in head setting mode.
Initialization of speed data [ ]
[Δ] of B
Not initialize by pressing [ ], and instead move to stitching mode.
End code [ ]
Stitching mode
[Δ] of B

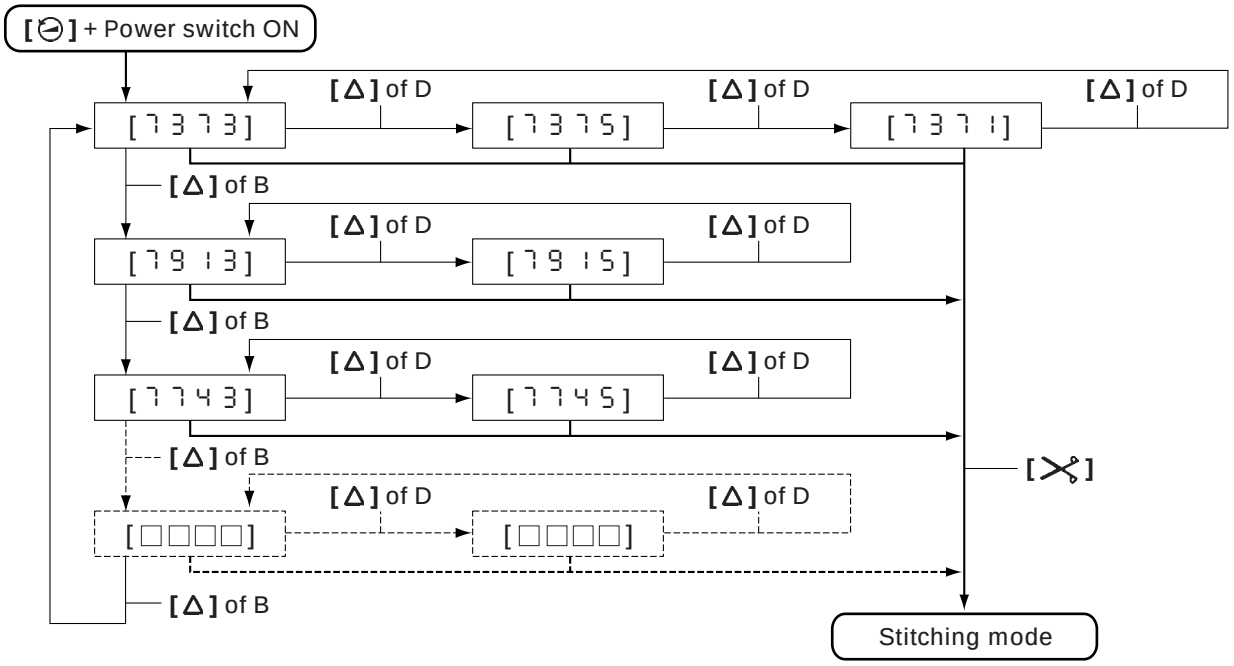
15.2 Head setting mode

Before the motor is shipped from the factory, the motor product code is determined for each head and is set to match the specifications of the head. If the motor is to be used for another head, replace the pulley with an appropriate one, and select the head No. with this mode. The specifications will then match the head.

The backtack stitching timing, etc., differs slightly according to the head. Thus, setting this mode accurately is recommended.

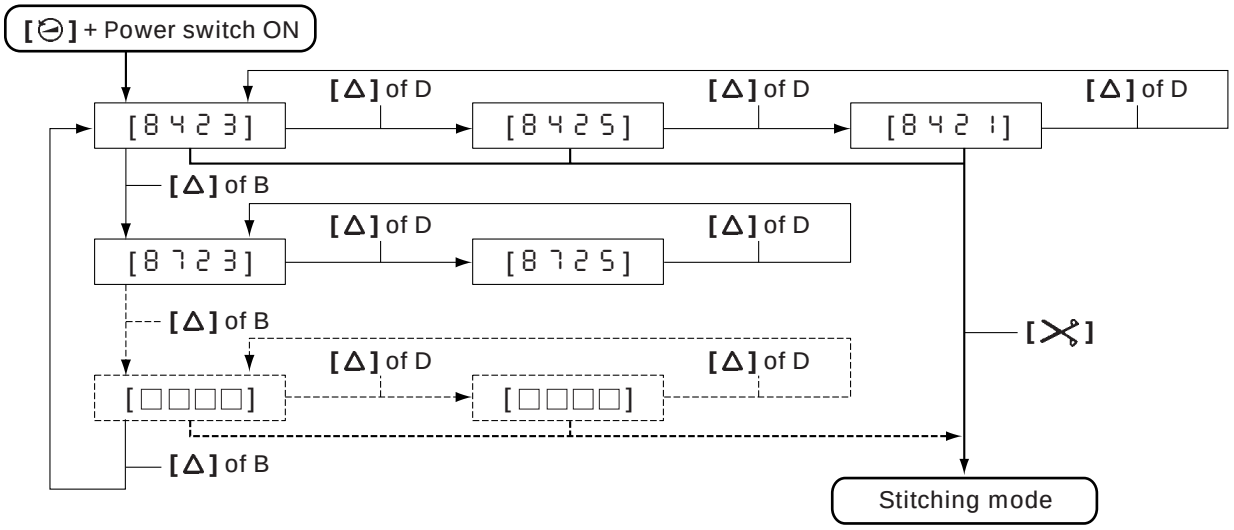
A. Setting method

A-1. When SW1-5 is set to OFF (single needle)



Display No. [7 3 7 3] indicates DB2-B737-□□3.
[7 3 7 5] indicates DB2-B737-□□5.
[7 3 7 1] indicates DB2-B737-□□1.

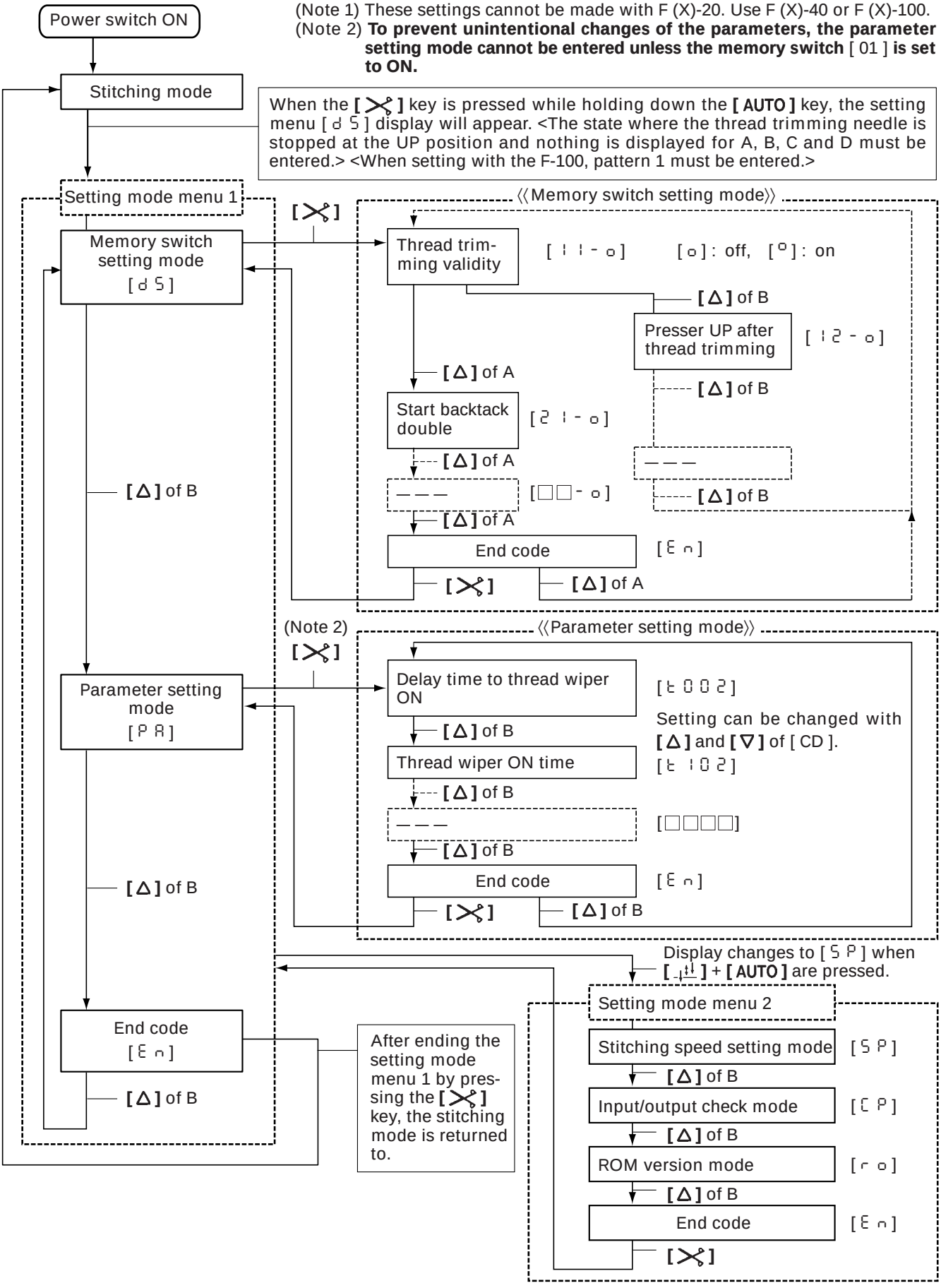
A-2. When SW1-5 is set to ON (twin needle)



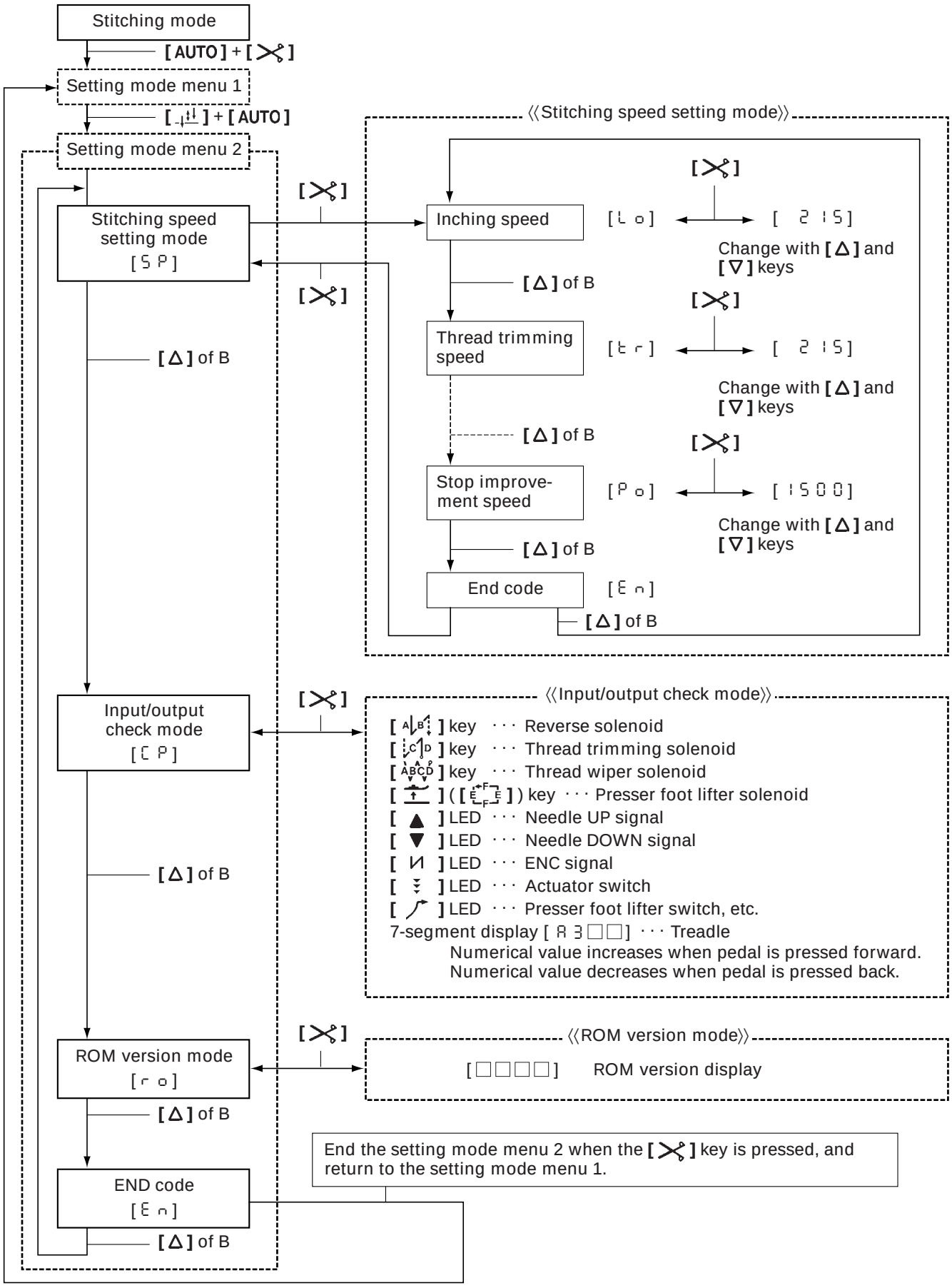
(Note 1) Only the maximum speed is set to match the head specifications, but the maximum stitching speed is limited by the SW1-6, 7, 8 setting.
(Note 2) The settings will be registered when the [ ] key is pressed.
If the settings are not to be changed, turn the power switch ON again without pressing the [ ] key.

15.3 Memory switch setting mode and parameter setting mode, etc.

A memory switch mode for changing the functions and a parameter mode where the time and timing, etc., can be changed are provided.



(Continued from previous page)


Stitching mode
[AUTO] + [✂]
Setting mode menu 1
[ ] + [AUTO]
Setting mode menu 2
Stitching speed setting mode [SP]
[Δ] of B
⟨⟨Stitching speed setting mode⟩⟩
Inching speed [Lo] [215]
Change with [Δ] and [∇] keys
Thread trimming speed [tr] [215]
Change with [Δ] and [∇] keys
Stop improvement speed [Po] [1500]
Change with [Δ] and [∇] keys
End code [En]
Input/output check mode [CP]
⟨⟨Input/output check mode⟩⟩
[ ] key ··· Reverse solenoid
[ ] key ··· Thread trimming solenoid
[ ] key ··· Thread wiper solenoid
[ ] ([ ]) key ··· Presser foot lifter solenoid
[ ] LED ··· Needle UP signal
[ ] LED ··· Needle DOWN signal
[ ] LED ··· ENC signal
[ ] LED ··· Actuator switch
[ ] LED ··· Presser foot lifter switch, etc.
7-segment display [A3□□] ··· Treadle
Numerical value increases when pedal is pressed forward.
Numerical value decreases when pedal is pressed back.
ROM version mode [ro]
⟨⟨ROM version mode⟩⟩
[□□□□] ROM version display
End the setting mode menu 2 when the [✂] key is pressed, and return to the setting mode menu 1.
END code [En]

15.4 Stitching speed setting mode

Each speed can be changed as described below by using the stitching speed setting mode.

① Setting of each stitching speed.

Normally, each speed determined by the product code corresponding to the head is set at the factory. To change the speeds, use the following procedures.

①-1 Press the **[ ]** key while holding down the **[AUTO]** key, and enter the mode setting menu 1.
①-2 Press the **[ ]** + **[AUTO]** keys, and enter the mode setting menu 2.
①-3 Press the **[ ]** key, and enter the stitching speed setting mode.
①-4 Select the speed type to be changed with the B **[Δ]** key.
①-5 When the **[ ]** key is pressed, the display will change to the setting speed (numerical value).
If **[ ]** is pressed at this time, the sewing machine will rotate at that speed. The display will monitor the actual speed, and display it. If **[ ]** is pressed again, the sewing machine will stop.
①-6 Set with the **[Δ]** and **[∇]** keys.
①-7 If the **[ ]** key is pressed, the display will return to the setting speed type.
①-8 Press the B **[Δ]** key several times, and display [En].
①-9 When the **[ ]** key is pressed, the mode setting menu 1 will be returned to.
①-10 Press the B **[Δ]** key several times, and display [En].
①-11 When the **[ ]** key is pressed, the stitching mode will be returned to.

The display and order of each speed type are as follows.

Speed type	Display	Setting unit	Setting range	Remarks
Inching speed	Lo	1rpm unit	150-280rpm	Speed for low-speed stitching and correction setting.
Thread trimming speed	tr	1rpm unit	150rpm–inching speed	Speed for thread trimming
Slow start speed	SL	100rpm unit	Inching speed–1000rpm	Speed for slow starting
Start backtack stitching limit speed	L1	100rpm unit	Inching speed–3000rpm	Limit speed for start backtack stitching
End backtack stitching limit speed	Eb	100rpm unit	Inching speed–3000rpm	Limit speed for end backtack stitching
High-speed stitching limit speed (Note 1)	H1	50rpm unit	Inching speed–DIP switch setting	Limit value for maximum stitching speed
Automatic stitching speed	AU	100rpm unit	Inching speed-High speed stitching limit speed	High speed for automatic stitching
Stop improvement speed	Po	100rpm unit	500-2500rpm	Middle speed for stop time improvement

(Note 1) The upper limit of the maximum stitching speed limit value is limited by the SW1-6, 7 and 8.
If 5000rpm is set with SW1-6, 7 and 8, (when ϕ105 pulley, single needle are designated), the speed can be set to a maximum of 5000rpm.
(Note 2) If the SW1-2, 5, SW6 setting is changed, all these speed settings will be initialized.
The head settings will also be initialized.
a) When SW1-5 is set to OFF (Initialized to head setting [7373])
b) When SW1-5 is set to ON (Initialized to head setting [8423])

16. Operational instructions

16.1 When the power SW is ON

- The motor power is created with the rectifying circuit and smoothing capacitor on the power PCB. To suppress the rush current, the smoothing capacitor is charged through the resistor. After charging, the relay contact closes and the smoothing capacitor is directly connected to the rectifying circuit.
- The solenoid power is 40VDC. This is created by rectifying and smoothing the 30VAC from the power transformer using the control PCB.
- For the control power, +5V and +8V stabilized power is created on the control PCB. The stabilized power is a dropper type.
- When the power is turned ON, connection of the operation panel and material edge sensor is checked. If these are not connected, the tacking function on the control box is validated.
- When the power is turned ON, connection of the synchronizer is checked. If the synchronizer is not connected, operation in the manner of a clutch motor will take place. As performance as a servomotor is not attained, this is not recommended unless the synchronizer is faulty.

16.2 When the power SW is OFF

- This motor has no special processes when the power is OFF.
- It takes approximately five minutes for the motor power's smoothing capacitor to discharge after the power is turned OFF. Make sure that the LED (red) on the PCB is OFF before starting maintenance of the power PCB.

16.3 Operation of the pedal

- The treadle unit outputs an analog voltage according to the pedal position. The control unit reads this voltage and converts it into a motor command.
- If it is not detected that the pedal is at the neutral position when the power is turned ON, the motor will not start. The neutral position is the treadle unit output 1.5V±0.4V.

16.4 While running

- The motor is controlled by controlling the 3-phase inverter's output frequency and output voltage.
  [P E] (power transistor error): Error when an error signal is received from the power PCB output element.
- The sewing machine pulley's rotation speed is detected by the sewing machine head's synchronizer. Feedback is controlled to reach the commanded speed.
  [L o] (lock): Error that occurs if the synchronizer signal is not detected for three seconds.
  [P U] (pulley error): Error that occurs if the sewing machine rotation exceeds the maximum speed setting. (The pulley setting is incorrect.)
- The motor drive power voltage is constantly checked, and the required control is executed. The following voltages are detected.
  [O u] (overvoltage): Error that occurs when 304VAC is exceeded.
  [O L] (overload): Error that occurs when a level 290VAC or more continues for 160ms.

17. Memory switch list

* The shaded fields indicate the default values.

Display No.	SW	Item & Contents
01	ON	Parameter setting change enabled (Parameter setting mode can be entered)
	OFF	Parameter setting change disabled (Parameter setting mode cannot be entered)
02	ON	No interlock during thread trimming
	OFF	No interlock during thread trimming (Invalid)
03	ON	Momentary drop or failure of power supply check valid
	OFF	Momentary drop or failure of power supply check (Invalid)
04	ON	SBT speed and EBT speed (No relation with high speed setting)
	OFF	SBT speed and EBT speed (No more than of high speed setting)
05	ON	(Not used)
	OFF	*Normally OFF
06	**ON**	No penetration force UP operation
	OFF	Penetration force UP operation
07	ON	(Not used)
	OFF	* Normally OFF
08	ON	(Not used)
	OFF	* Normally OFF
11	ON	Thread trimming validity setting enabled (F-operation panel is connected) * [✂] ON enabled, [✂] OFF not enabled
	OFF	Thread trimming validity setting disabled (Treadle repression always includes thread trimming)
12	ON	Presser lifter rise after thread trimming when the treadle is neutral (In the case of SW1-1 ON) Presser lifter descent after thread trimming when the treadle is neutral (In the case of SW1-1 OFF)
	OFF	Presser lifter descent after thread trimming when the treadle is neutral (In the case of SW1-1 ON) Presser lifter rise after thread trimming when the treadle is neutral (In the case of SW1-1 OFF)
13	ON	Presser lifter rise after neutral stop when the treadle is neutral stop.
	OFF	Presser lifter descent after neutral stop when the treadle is neutral stop.
14	ON	(Not used)
	OFF	* Normally OFF
15	ON	Normally is deceleration
	OFF	Quick stop is deceleration
16	ON	No over time [ot] function
	OFF	Over time [ot] function (By a continuous 3 minutes stop)
17	ON	[⇕] OFF, Actuator switch = Half stitch correction switch [⇕] ON, Actuator switch = 1 stitch correction switch
	OFF	[⇕] OFF, Actuator switch = Normally switch [⇕] ON, Actuator switch = 1 stitch correction switch
18	ON	[⇕] OFF, Actuator switch = Reverse stitch correction switch [⇕] ON, Actuator switch = 1 stitch correction switch
	OFF	[⇕] OFF, Actuator switch = Normally switch [⇕] ON, Actuator switch = 1 stitch correction switch

Display No.	SW	Item & Contents
21	ON	Start tacking double (A, B, A, B)
	OFF	Start tacking single (A, B)
22	ON	End tacking double (C, D, C, D)
	OFF	End tacking single (C, D)
23	ON	No. of start tacking stitches + 10 (A + 10 , B + 10)
	OFF	Normally (A, B)
24	ON	No of end tacking stitches + 10 (C + 10, D + 10)
	OFF	Normally (C, D)
25	ON	Root stitching (Stop with reverse ON after start tacking) * Active, when [ ] is ON and memory switch 31 is set OFF.
	OFF	Stop with reverse OFF after start tacking * Active, when memory switch [68] is set OFF.
26	ON	No slow down to low speed on starting of end tacking
	OFF	Slow down to low speed on starting of end tacking After end tacking goes into acceleration
27	ON	Continuous tacking A, B [stitches] × D [Number of time]
	OFF	Continuous tacking A, B, C, D
28	ON	No. of continuous tacking stitches + 10 stitches
	OFF	Normally
31	ON	Enable to stop during start tacking, speed is variable with treadle. (start tacking speed at maximum treadle repression)
	OFF	Not enable to stop during start tacking, speed is keep speed by treadle. (start tacking speed)
32	**ON**	F-20, 40 No. of tacking stitches change enabled * Tacking stitches are ABCD set No.
	OFF	F-20, 40 No. of tacking stitches change disabled. * No. of stitches is fixed with 4, when switch F-20 [ ], F-40 [ ] ON. * No. of AB tacking stitches are sewn when switch F-40 of [ ] [ ] ON.
33	ON	Call fixed stitches when pleats sewing will be used.
	OFF	No call fixed stitches when pleats sewing will be used.
34	ON	No LED call when continuous tacking [ ] is canceled
	OFF	LED call when continuous tacking [ ] is canceled. Set [ ], [ ], [ ], [ ], [ ] is call back. When [ ] switch is OFF.
35	ON	Soft down of presser lifer is timer mode (OFF time is [F3], ON time is [F4])
	OFF	Soft down of presser lifter is analog mode (ON time is [F4] of setting timer)
36	ON	Holding time control of presser lifter is not OFF by timer
	OFF	Holding time control of presser lifter is not ON by timer (ON time is [F1] of setting timer)
37	ON	Chopping duty of presser lifter setting
	OFF	
38	ON	
	OFF	

37	38	ON	OFF	Transistor controlling
OFF	**OFF**	**2.5ms**	**2.5ms**	Upper and lower transistor ON/OFF at a same time
ON	OFF	1ms	1ms	
OFF	ON	1ms	5ms	Upper transistor keep ON, lower transistor ON/OFF.
ON	ON	1ms	1ms	

Display No.	SW	Item & Contents
41	ON	Lifting of presser lifter invalid at treadle repressed backwards to 1st step
	OFF	Normally
42	ON	Prohibit to thread trimming by treadle repressed backwards * For overlock, etc.
	OFF	Normally
43	ON	Chain stitch thread trimming (at needle UP position, motor stopped)
	OFF	Lockstitch thread trimming operation
44	ON	High-speed pedal during standing work is only high speed. (no inching speed and variable speed area)
	OFF	Standing work pedal for variable speed
45	ON	Standing work delay start invalid
	OFF	Standing work delay start valid
46	ON	Emergency stop by presser pedal disabled during standing work (during automatic stitching)
	OFF	Emergency stop by presser pedal enabled during standing work (during automatic stitching)
47	ON	Emergency stop by high-speed pedal disabled during standing work (during automatic stitching)
	OFF	Emergency stop by high-speed pedal enabled during standing work (during automatic stitching)
48	ON	Prohibit to rise of presser lifter with trimming pedal during standing work
	OFF	Normally
51	ON	Active correction by actuator switch after trimming
	OFF	Inactive correction by actuator switch after trimming
52	ON	(Not used)
	OFF	* Normally OFF
53	ON	(Not used)
	OFF	* Normally OFF
54	ON	(Not used)
	OFF	* Normally OFF
55	ON	After presser foot lowers with treadle repressed forward to 1st step, presser foot does not lift when treadle is pressed to neutral position. After repressing treadle backward, presser foot lowers when treadle is pressed to neutral position. * Whent SW1-1 is ON (when memory switch [12] or [13] is set to ON)
	OFF	After presser foot lowers with treadle repressed forward to 1st step, presser foot lifts when treadle is pressed to neutral position. After repressing treadle backward, presser foot does not lift when treadle is pressed to neutral position * When SW1-1 is ON (when memory switch [12] or [13] is set to ON)
56	ON	After thread trimming, pressing treadle forward ON stroke is not changed after pressing treadle backward.
	OFF	After thread trimming, pressing treadle forward ON stroke is changed after pressing treadle backward. * Reduction of incorrect forward treadle repressing operation caused by rebound of treadle from backward repressing
57	ON	Presser foot does not lower when treadle is pressed forward 1st step.
	OFF	Presser foot lowers when treadle is pressed forward 1st step.
58	ON	(Not used)
	OFF	* Normally OFF

Display No.	SW	Item & Contents
61	ON	Reverse rotation needle UP operation enabled
	OFF	Reverse rotation needle UP operation disabled
62	ON	When reverse rotation needle UP operation is enabled, raise needle and then wipe. * When memory switch [61] is ON
	OFF	When reverse rotation needle UP operation is enabled, wipe and then raise needle. * When memory switch [61] is ON
63	ON	Timer operates thread trimming * When B852 is set , timer time is set with parameter [d0].
	OFF	Thread trimming is turned ON with needle DOWN signal, and OFF with needle UP signal
64	ON	When needle is raised and stop with [ ] key and actuator switch, needle stops at reverse rotation needle UP position * When memory switch [61] is ON
	OFF	When needle is raised and stop with [ ] key and actuator switch, needle stops at needle UP position
65	ON	(Not used)
	OFF	* Normally OFF
66	ON	When reverse needle UP operation is enabled, presser turns ON before needle UP. * When memory switch [62] is set to OFF, presser turns ON after thread wiping
	OFF	When reverse needle UP operation is enabled, presser turns ON after needle UP
67	ON	(Not used)
	OFF	* Normally OFF
68	ON	Sewing machine stops temporarily when automatic tacking reverse solenoid is changed over. * Machine can stop when switching to reverse of automatic tacking so that stitch length of tacking will be same. Parameter [b4]: stop time can be set (initial: 100ms) Parameter [b5]: temporary stop position can be set
	OFF	Sewing machine does not stop temporarily when automatic tacking reverse solenoid is changed over
※ 71	ON	Output during running (needle cooler, etc.)
	OFF	* Normally OFF
※ 72	ON	Thread release output (3 position)
	OFF	* Normally OFF
※ 73	ON	Air (ON while the No. of stitches (parameter [C1]) & after fabric edge sensor turns ON.)
	OFF	Normally OFF
※ 74	ON	Condense output (ON while stitching [A] when B = 0, ON while stitching [D] when C = 0)
	OFF	* Normally OFF
※ 75	ON	Program output 1 (ON after thread trimming, after T0 (parameter [C2]), during T1(parameter [C3]))
	OFF	Normally OFF
※ 76	ON	Program output 2 (ON during presser synchronization, after T2 (parameter [C4]) during T3 (parameter [C5]))
	OFF	* Normally OFF
※ 77	ON	(Not used)
	OFF	* Normally OFF
※ 78	ON	(Not used)
	OFF	* Normally OFF

※ When one is turned to ON, the other will be set to OFF. IF all are set to OFF, the puller output will be applied. ON when presser or reverse solenoid is ON. OFF after the No. of stitches (parameter [C0]) or after 10 seconds have passed.

Display No.	SW	Item & Contents
81	ON	(Not used)
	OFF	Normally OFF
82	ON	(Not used)
	OFF	Normally OFF
83	ON	Presser foot rise by treadle is always active. * Only when SW1-1 is set to OFF
	OFF	Presser foot rise by treadle is not active after use of knee switch (presser lifter switch). * Only when SW1-1 is set to OFF
84	ON	Inching speed < Thread trimming speed * Inching speed can be set to slower than thread trimming speed to facilitate 1 stitch sewing.
	OFF	Inching speed ≥ Thread trimming speed
85	ON	Speed of end tacking = Speed of start tacklng * Setting speed of end tacking to same as start tacking
	OFF	Speed of end tacking = Speed of end tacking
86	ON	Servo lock timer OFF operation disabled
	OFF	Servo lock timer OFF operation enabled
87	ON	Brake force increases with presser UP/DOWN signal * When memory switch [88] is set to ON
	OFF	Brake force does not increase with presser UP/DOWN signal * When memory switch [88] is set to ON
88	ON	Servo lock enabled
	OFF	Servo lock disabled
91	ON	(Not used)
	OFF	Normally OFF
92	ON	(Not used)
	OFF	Normally OFF
93	ON	Treadle operation valid after standing work (during simultaneous operation, standing work has priority)
	OFF	Treadle operation invalid after standing work
94	ON	(Not used)
	OFF	Normally OFF
95	ON	(Not used)
	OFF	Normally OFF
96	ON	(Not used)
	OFF	Normally OFF
97	ON	(Not used)
	OFF	Normally OFF
98	ON	(Not used)
	OFF	Normally OFF

18. Parameter list

(Note) The default data is the value set in B737 with the machine head setting.

Display No.	Initial data	Data setting range	Detailes
t0	**02 (20ms)**	00 to 90 (×10) (0 to 990ms)	Thread wiper ON delay time
t1	**05 (50ms)**	00 to 90 (×10) (0 to 990ms)	Thread wiper ON time
t2	**05 (50ms)**	00 to 90 (×10) (0 to 990ms)	Wiper OFF to presser lifting ON delay time
F0	**30 (300ms)**	00 to 90 (×10) (0 to 990ms)	Presser lifter full-ON time
F1	**60 (3 min)**	00 to 30 (×10) (0 to 30 sec) 31 to 96 (×5) (35 sec to 6 min)	Holding time of presser lifter 00 : Does not turn OFF automatically 01 to 30 : 1 to 30 sec (Set in one second increments) 31 to 96 : 35 sec to 6 min (Set in five seconds increments)
F2	**15 (150ms)**	00 to 99 (×10) (0 to 990ms)	Delay time from presser lifter is lowered to motor start.
F3	**00 (0ms)**	00 to 99 (×2) (0 to 198ms)	Presser UP signal OFF time (soft down) * Valid only when memory switch [35] is set to ON
F4	**00 (0ms)**	00 to 30 (×10) (0 to 300ms)	Presser up signal ON time (soft down)
F5	**00**	00 to 99	(not used)
F6	**00**	00 to 99	(not used)
F8	**07**	01 to 99	(not used)
F9	**07**	01 to 99	(not used)
FA	**10**	01 to 99	(not used)
b0	**24 (pulse)**	00 to 47 (pulse)	Start tacking A → B reverse solenoid ON timing (The larger the value is, the larger the timing delays.) (The smaller the value is, the faster the timing becomes.)
b1	**24 (pulse)**	00 to 47 (pulse)	Start tacking B end reverse solenoid OFF timing (The larger the value is, the larger the timing delays.) (The smaller the value is, the faster the timing becomes.)
b2	**24 (pulse)**	00 to 47 (pulse)	End tacking C → D reverse solenoid ON timing (The larger the value is, the larger the timing delays.) (The smaller the value is, the faster the timing becomes.)
b3	**24 (pulse)**	00 to 47 (pulse)	End tacking D → C or C ON reverse solenoid ON timing (The larger the value is, the larger the timing delays.) (The smaller the value is, the faster the timing becomes.) * When memory switch [22], [26] is set to ON
b4	**10 (100ms)**	05 to 50 (×10) (50 to 500ms)	Stop time during reverse change timing * When memory switch [68] is set to ON
b5	**11 (pulse)**	00 to 23 (pulse)	Temporary stop position during reverse change timing (Number of pulses from needle UP signal) * When memory switch [68] is set to ON

Display No.	Initial data	Data setting range	Detailes
	00 (stitch)	00 to 99 (stitch)	No. of stitches to puller lower (Memory swtches [71]-[78] all OFF, factory setting)
	10 (stitch)	00 to 99 (stitch)	No. of option output ON stitches (N) (When memory switch [73] is set to ON)
	05 (50ms)	00 to 90 (×10) (0 to 990ms)	Delay time to program output 1 ON (T0) (When memory switch [75] is set to ON)
	08 (80ms)	00 to 90 (×10) (0 to 990ms)	Program output 1 ON time (T1) (When memory switch [75] is set to ON)
	00 (0ms)	00 to 99 (×10) (0 to 990ms)	Delay time to program output 2 0N (T2) (When memory switch [76] is se to ON)
	20 (2s)	00 to 90 (×0.1) (0 to 9.9s)	Program output 2 ON time (T3) (When memory switch [76] is set to ON)
	00 (0ms)	00 to 99 (×10) (0 to 990ms)	Thread release OFF delay-time * When B781 is set * Time to OFF after needle trimming stop
	02 (stitch)	00 to 09 (stitch)	Slow start number of stitches
	00	00 to 99	(not used)
	00	00 to 99	(not used)
	00	01 to 99	(not used)
	00	00 to 99	(not used)
	00	00 to 99	(not used)
	00	00 to 99	(not used)
	00	00 to 99	(not used)
	10	00 to 99	(not used)
	18 (90ms)	00 to 99 (×5) (0 to 495ms)	Thread trimmer ON time * For B852 * When memory switch [63] is set to ON
	08 (80ms)	00 to 20 (×10) (0 to 200ms)	Standing work delay start time
	00	00 to 24	(not used)
	00	00 to 99	(not used)
	66	40 to 70	(not used)
	03 (3 min)	00 to 30 (×1) (0 to 30 min)	Overtime detection time * When memory switch [16] is set to OFF (function valid) * Overtime not detected when 00 is set
	00	00 to 99	(not used)

Display No.	Initial data	Data setting range	Detailes
P0	**02** **DOM. 0.5V** **EXP. 0.4V**	00 to 04	Treadle stroke, treadle backward repression to 1st step (presser point) (When the numerical value is large, the stroke to thread trimming is short) (When the numerical value is small, the stroke to thread trimming is long)
P1	**02** **(1.1V)**	00 to 04	Treadle stroke, treadle backward repression to 1st step (presser UP point) (When the numerical value is large, the stroke to the presser lifter ON is short)
P2	**02** **DOM. None** **EXP. 1.9V**	00 to 04	Treadle stroke, forward 1st step (presser DOWN point) (When the numerical value is large, the stroke to presser foot lowering is long)
P3	**02** **DOM. 2.0V** **EXP. 1.9V**	00 to 04	Treadle stroke, inching start point (When the numerical value is small, the stroke to the motor start is short) (When the numerical value is large, the stroke to the motor start is large)
P4	**02** **DOM. 2.6V** **EXP. 3.0V**	00 to 04	Treadle stroke, variable speed range start point (When the numerical value is small, the variable speed area will increase) (When the numerical value is large, the inching speed area will increase)
P5	**02** **(4.2V)**	00 to 04	Treadle stroke, high speed reach point (When the numerical value is small, the stroke to the high speed area is short) (When the numerical value is large, the variable speed area will increase)
S0	**02**	00 to 04	Standing work pedal for variable speed, variable speed range start point (When the numerical value is small, the variable speed area will increase) (When the numerical value is large, the inching speed area will increase)
S1	**02**	00 to 04	Standing work pedal for variable speed, high speed reach point (When the numerical value is small, the stroke to the high speed area is short) (When the numerical value is large, the variable speed area will increase)
n0	**07**	04 to 50	(don't change)
n1	**15**	05 to 30	(don't change)
n2	**10**	05 to 30	(don't change)
n3	**10**	00 to 70	(don't change)
n4	**10**	01 to 23	(don't change)
n5	**10**	00 to 70	(don't change)

Display No.	Initial data	Data setting range	Detailes
n6	**10 (100ms)**	07 to 50 (×10) (70 to 500ms)	Starting time (When the numerical value is small, the motor will start up faster)
n7	**10 (100ms)**	07 to 50 (×10) (70 to 500ms)	Stopping time (When the numerical value is small, the motor will stop faster)
n8	**15**	01 to 40	(don't change)
n9	**20**	01 to 20	(don't change)
nA	**07**	01 to 20	(don't change)
nb	**15**	01 to 20	(don't change)
nC	**07**	01 to 20	(don't change)
nd	**28**	04 to 70	(don't change)
nE	**14**	04 to 70	(don't change)
nF	**20**	04 to 70	(don't change)
nG	**10**	01 to 20	(don't change)
nH	**24**	04 to 70	(don't change)
n1	**50**	10 to 99	(don't change)
nJ	**40**	05 to 70	(don't change)
nL	**15**	00 to 50	(don't change)
nn	**05**	00 to 70	(don't change)
nn	**05**	01 to 30	(don't change)
no	**15**	01 to 30	(don't change)
nP	**20**	01 to 99	(don't change)
n9	**30**	01 to 99	(don't change)

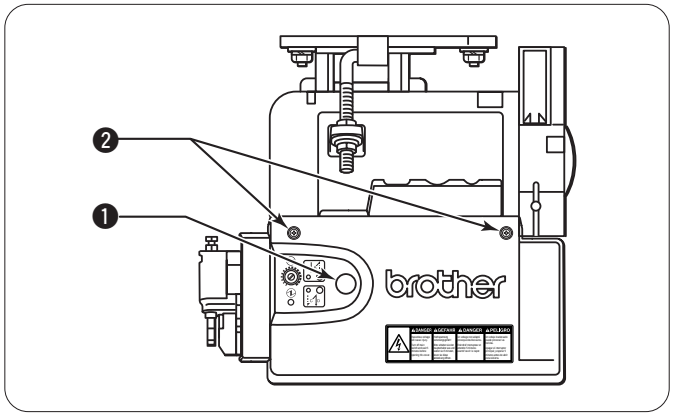
(Note) Parameters [n0] ~ [n5], [n8] ~ [n9] must not be changed. If they are changed by mistake, initialize the parameters with the initialization mode.

19. Panel display table

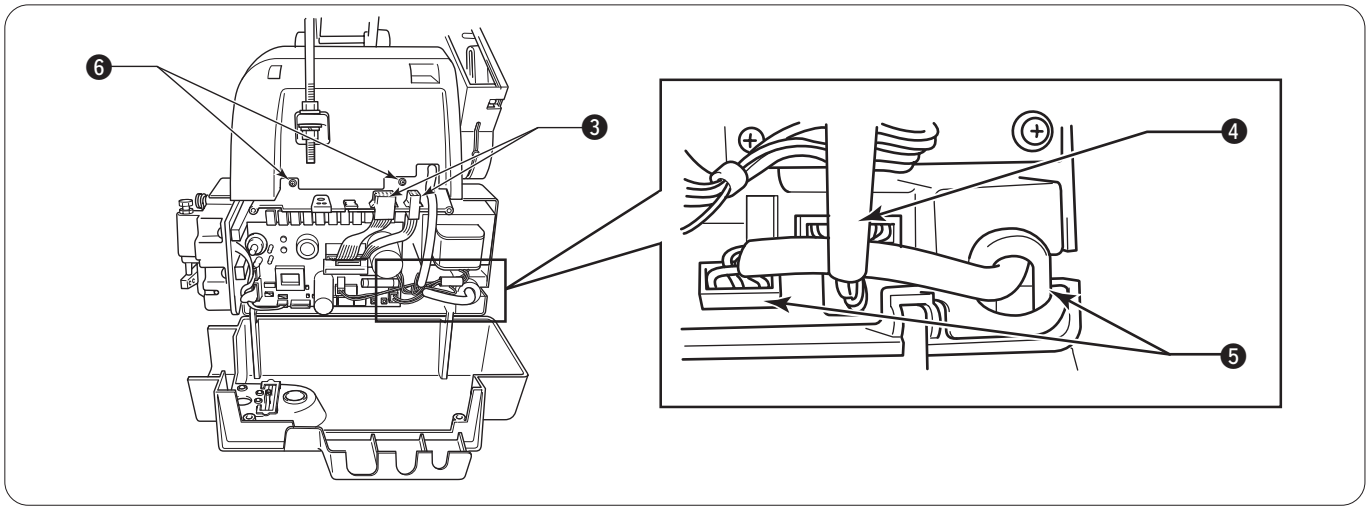
The following alphabetic characters and symbols are displayed on the operation panel.

	7-segment display		7-segment display		7-segment display		7-segment display
0		A		N		ON	
1		B		O		OFF	
2		C		P			
3		D		Q			
4		E		R			
5		F		S			
6		G		T			
7		H		U			
8		I		V			
9		J		W			
+		K		X			
-		L		Y			
		M		Z			

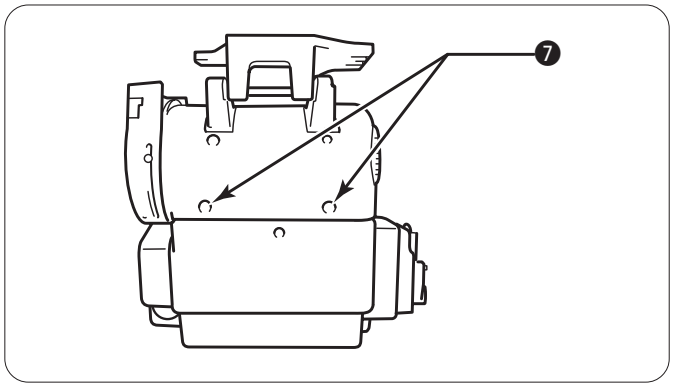
20. How to remove the control box



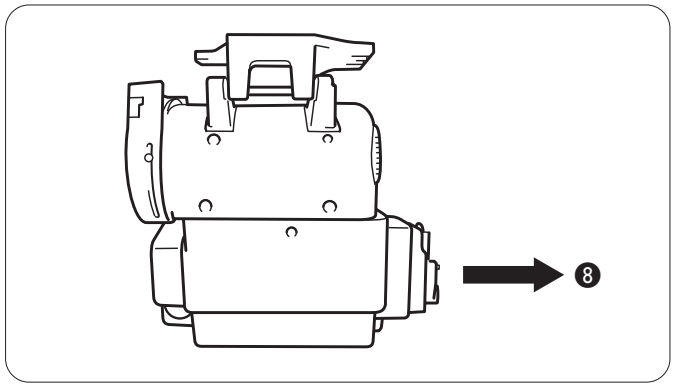
❶. Disconnect the synchronizer cord.
❷. Loosen the two screws, and open the box's cover.



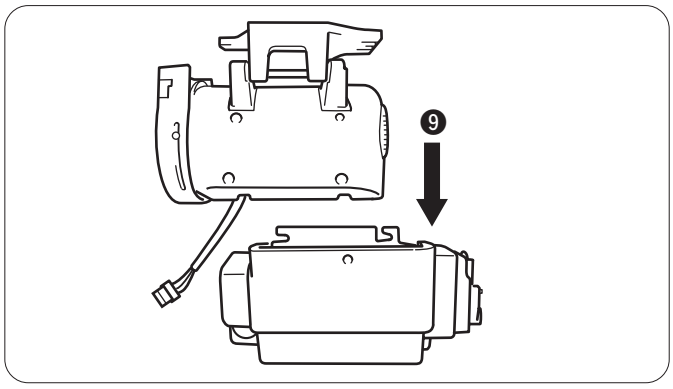
❸. Disconnect the cords from the machine and panel.
❹. Disconnect the motor connector.
❺. Disconnect the power supply connector and bushing.
❻. Loosen the screws fixing the control box to the motor by about half. (Two places)



❼. In the same manner, loosen the screws on the opposite side by about half. (Two places)



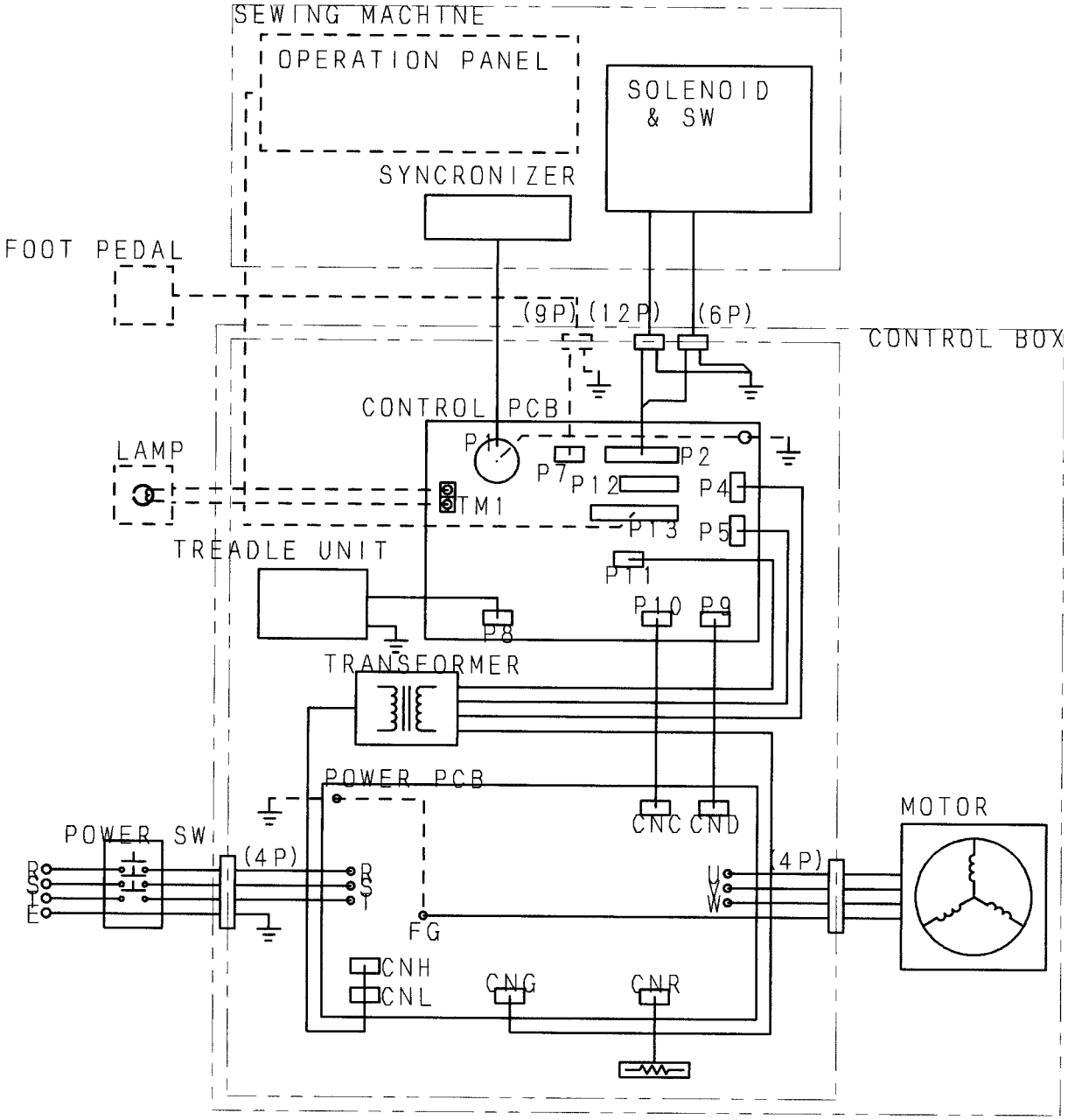
❽. Slide the control box to the right.

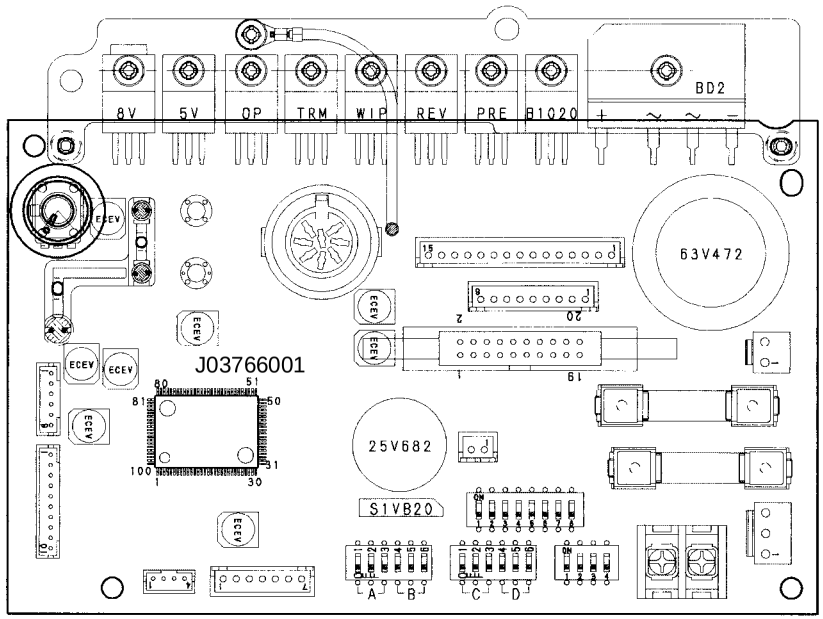


❾. Lower the control box.
❿. Install the control box, following the above instructions in reverse.

BLOCK DIAGRAM OF CONTROL BOX

(THREE PHASE)

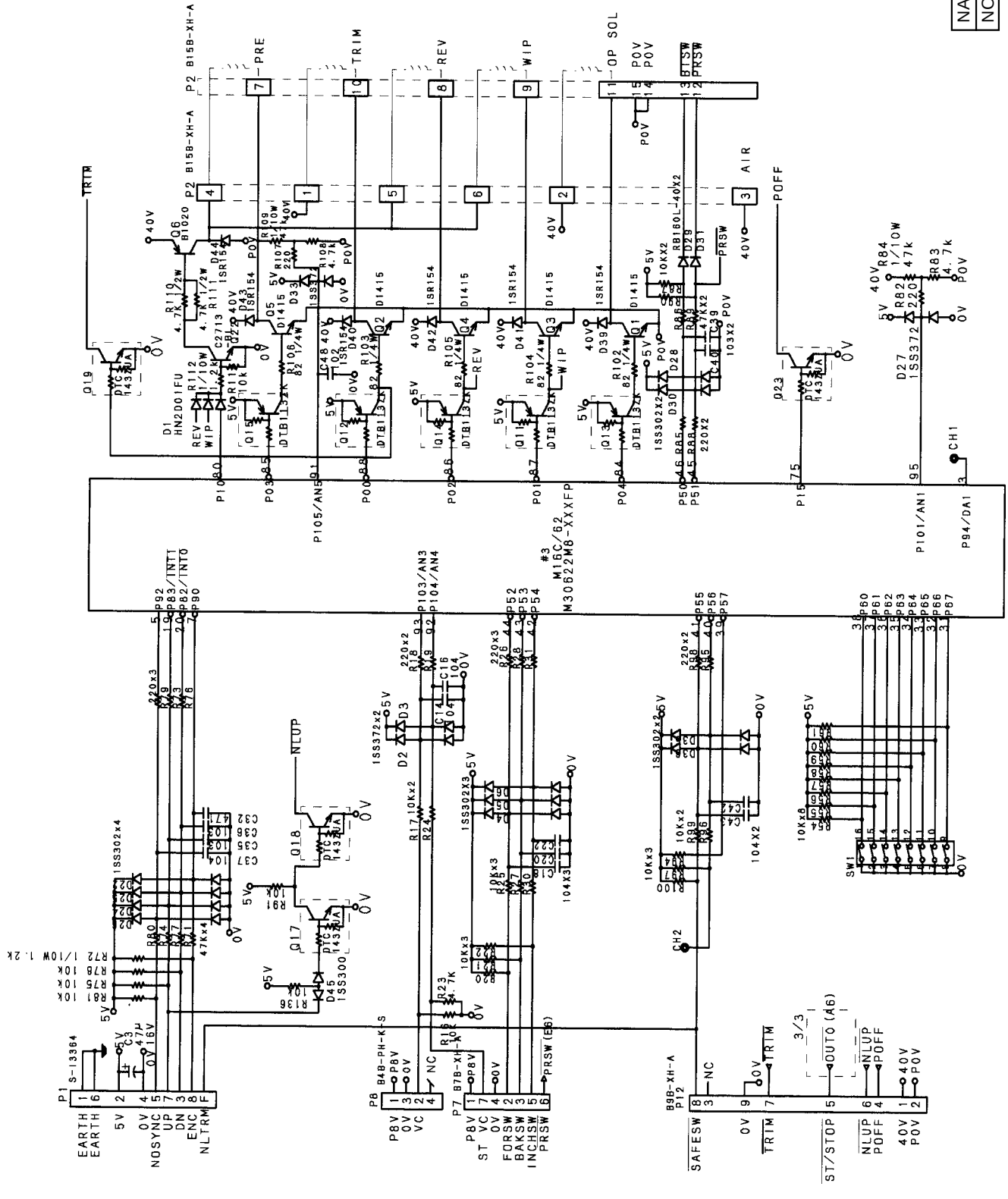


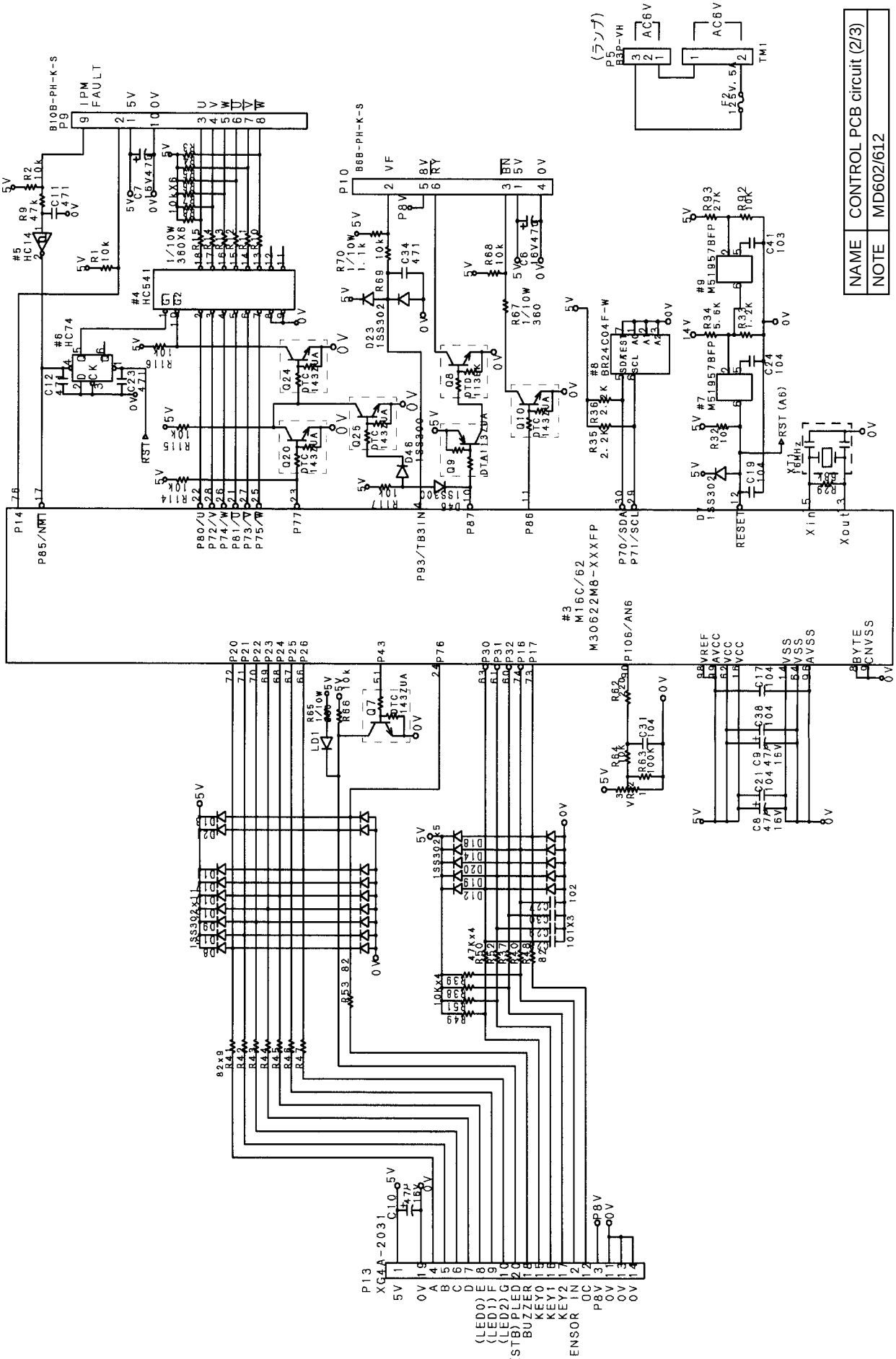


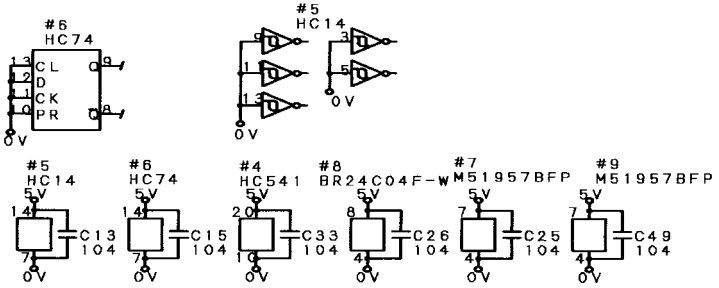
NAME	CONTROL PCB ASSY, MD602
CODE	J80900001

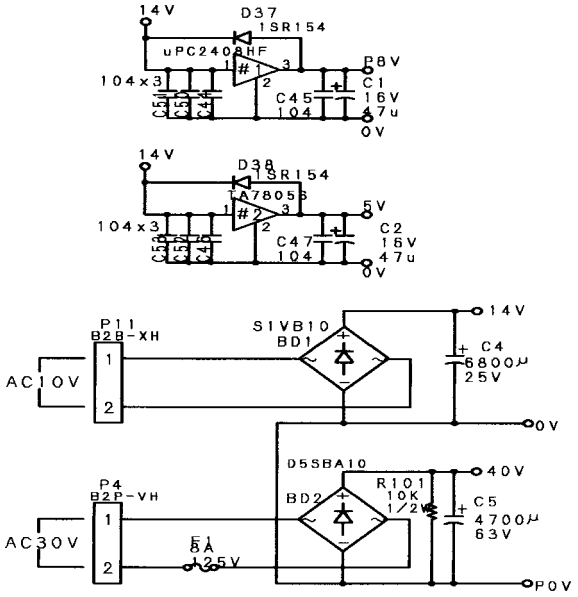
SYMBOL	CODE	Q'ty	NAME	NOTE
#3	J03825001	1	MCU:M30622M8-B32	J03825-C
#2	T30113000	1	REGURATOR:TA7805S	
#1	J02747001	1	REGURATOR:UPC2408HF	
#6	093150074	1	IC:74HC74F	
#4	093150541	1	IC:74HC541F	
#8	J03769001	1	EEPROM:BR24C04F-W	
#7, #9	J00810001	2	RESET:M51957BFP	
#5	093150014	1	IC:74HC14F	
Q6	J02637001	1	TRANSISTOR, :2SB1020	
Q1, Q5	233276001	2	TRANSISTOR, :2SD1415	
Q2, Q3, Q4	233276001	3	TRANSISTOR, :2SD1415/2SD1889	
BD1	226170000	1	DIODE, BR:S1VB20	
BD2	S47669000	1	DIODE, BR:D5SB20	
XT1	J03822001	1	CERAMIC OSCILLATOR, 16M	CSTCV16.00MXJ0C1
LD1	J00623001	1	DIODE, LIGHT EMIT:LN31GPH	
LD2, LD3	U88008000	2	DIODE, LIGHT EMIT:SLR-342MG	
*	J03734001	1	LED HOLDER, LCA	
VR1	J03772001	1	VARIABLE RESISTOR, DVR-1R0B103L20	
*	J03733001	1	KNOB, LCA	
C4	J02755001	1	CAPACITOR, ALUM-ELEC 25B682	
C5	J02236001	1	CAPACITOR, ALUM-ELEC 63B472	
SW1	J03590001	1	DIP SW:A6T8104	
SW2, SW3	J03405001	2	DIP SW:A6T6104	
SW4, SW5	UG6710000	2	KEY SW:SKQNAD	
SW6	J03591001	1	DIP SW:A6T4104	
P13	J02636001	1	CONNECTOR:HIF3BA-20PA	
P8	U16686000	1	CONNECTOR:B4B-PH	
P1	233285001	1	CONNECTOR:S-13364	
P12	U04256000	1	CONNECTOR:B9B-XH-A	
P7	UH0016000	1	CONNECTOR:B7B-XH	
P2	J01811001	1	CONNECTOR:B15B-XH-A	
P4	132575001	1	CONNECTOR:B2P-VH	
P5	J00755001	1	CONNECTOR:B3P-VH	
P11	U04254000	1	CONNECTOR:B2B-XH-A	
P9	U84247000	1	CONNECTOR:B10B-PH	
P10	S38158000	1	CONNECTOR:B6B-PH	
TM1	J02760001	1	TERMINAL:ML-40S1	
F1	219225000	1	GLASS FUSE, 8A	
F2	J02759001	1	GLASS FUSE:FGBO-5AH	

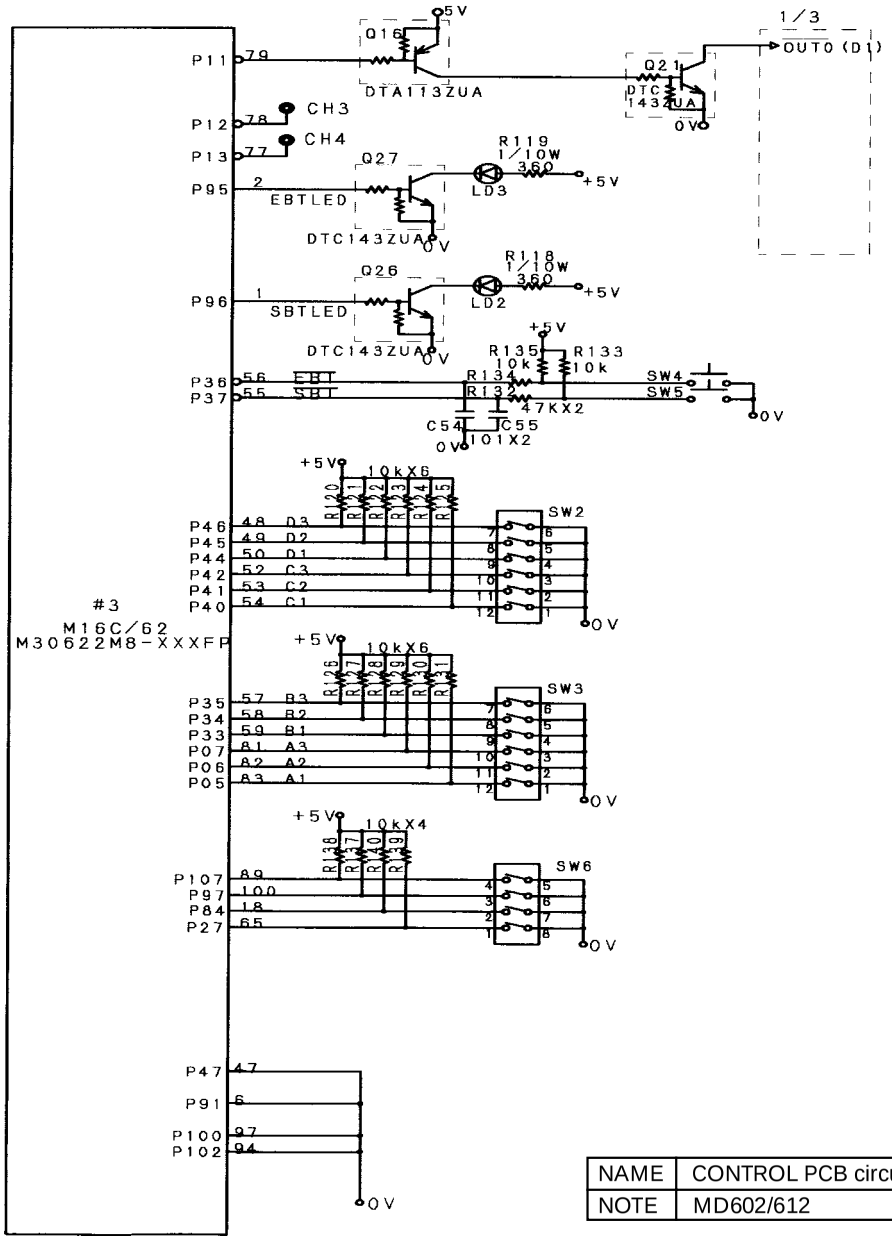
NAME	CONTROL PCB circuit (1/3)
NOTE	MD602/612




NAME
CONTROL PCB circuit (2/3)
NOTE
MD602/612



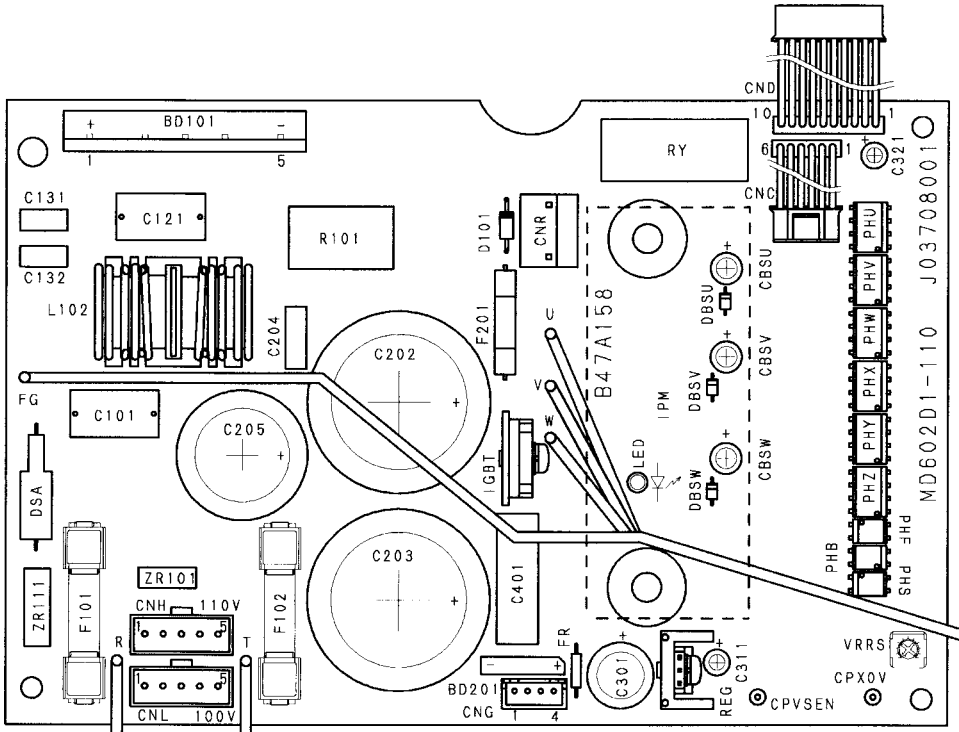


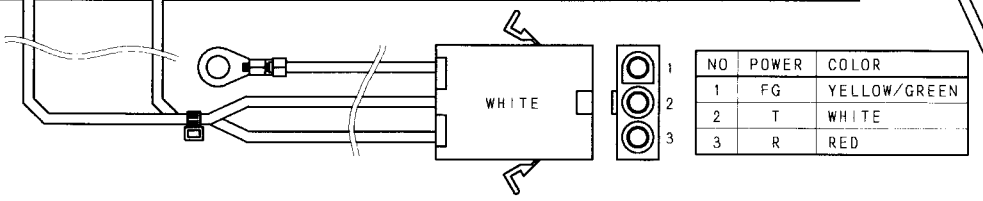


NAME	CONTROL PCB circuit (3/3)
NOTE	MD602/612

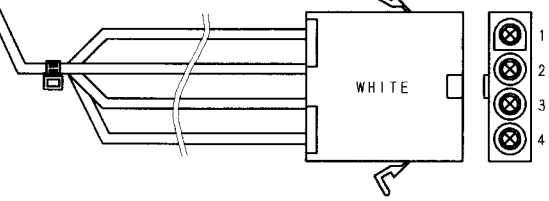
SYMBOL	Q'ty	CODE	NAME	NOTE
IPM	1	J03712-001	IPM:MIG20J501L	SOLDER SIDE
VFC	1	J03709-001	V-F CONVERTER:NJM4151M	SOLDER SIDE
AMP	1	J03622-001	OP-AMP:NJM2904M	SOLDER SIDE
IGBT	1	J00775-001	TRANSISTOR, IGBT:1MB05-120	
IGBT (HOLDER)	1	J02715-001	IGBT HOLDER	
REG	1	J00249-001	REGULATOR:UPC7815AHF	
REG (HEAT SINK)	1	J02714-001	HEATSINK:OSH-1035-SPL	
IGBT, REG (SCREW)	2	0A4300-805	SCREW, PAN(S/P WASHER)M3X8	
TRS	1	J03714-001	TRANSISTOR:2SC2712Y	SOLDER SIDE
DQ101, DQ102	2	UG5563-000	TRANSISTOR:TRDTC143EKA	SOLDER SIDE

SYMBOL	Q'ty	CODE	NAME	NOTE
BD101	1	J02699-001	DIODE, BR:D20L6P45	
BD201	1	226170-000	DIODE, BR:S1VB20	
D101	1	J02703-001	DIODE, :ERB44-10	
D201, D211, D212	3	J02625-001	DIODE, :1SR154-400	SOLDER SIDE
DBSU, DBSV, DBSW	3	J03779-001	DIODE, :1JU42	
DU, DV, DW, DX, DY, DZ	6	J02613-001	DIODE, AR:1SS302	SOLDER SIDE
ZD101	1	YE0004-705	DIODE, ZENER:UDZ4.7B+	SOLDER SIDE
LED	1	J00817-001	DIODE, LIGHT EMIT:LN28RPX(TA3)	
PHF, PHB, PHS	3	U82859-000	PHOTO COUPLER:TLP521-1(GB)	
PHU, PHV, PHW, PHX, PHY, PHZ	6	J02465-001	PHOTO COUPLER:TLP559HV	
R101	1	J03465-001	FIXED RESISTOR, M-B20W4R7	
VRRS	1	UK3754-000	VARIABLE RESISTOR, C-1R0B502	
FR	1	J02706-001	FUSIBLE RESISTOR, G-A16AKR47	
L102	1	J03583-001	COIL:LF-25-10-30	
C202, C203	2	J03531-001	CAPACITOR, ALUM-ELEC 250B182	
C301	1	Y41025-591	CAPACITOR, ALUM-ELEC 50B102	
C311, C321	2	Y41012-521	CAPACITOR, ALUM-ELEC 16B101	
CBSU, CBSV, CBSW	3	Y41013-591	CAPACITOR, ALUM-ELEC 25B101	
C205	1	J03782-001	CAPACITOR, ALUM-ELEC 450B331	
C101, C121	2	J03616-001	CAPACITOR, POLYESTER 250B224	
C401	1	J03617-001	CAPACITOR, POLYESTER 630B224	
C131, C132	2	J03780-001	CAPACITOR, CERAMIC 250B222	
C204	1	UG3704-000	CAPACITOR, CERAMIC 250B332	
ZR101	1	232380-001	SURGE ABSORBER:ENC621D-10A	
ZR111	1	J02696-001	SURGE ABSORBER:ENC621D-14A	
DSA	1	232384-001	SURGE ABSORBER:DSA362MA	
RY	1	J03704-001	RELAY:ALE15B06	
F101, F102	2	J02585-001	GLASS FUSE, 20A-250V:FGB0	
F101, F102 (HOLDER)	4	J01684-001	FUSE HOLDER:F062	
F201	1	J02727-001	GLASS FUSE, 2A-250V:FGMLB	
CPX0V, CPVSEN	2	752246-001	PIN:RT-01T-1.3B	
CNG	1	U15643-000	CONNECTOR:B4B-XH-A	
CNR	1	J02709-001	CONNECTOR:5285-02A	
CNH, CNL	2	J02720-001	CONNECTOR:52358-0510	
CNC	1	J03688-001	WIRE ASSEMBLY, S-D6P	
CND	1	J03689-001	WIRE ASSEMBLY, S-D10P	
R, T	1	J03694-001	WIRE ASSEMBLY, 1-100V602	
U, V, W, FG	1	J03691-001	WIRE ASSEMBLY, MOTOR602	



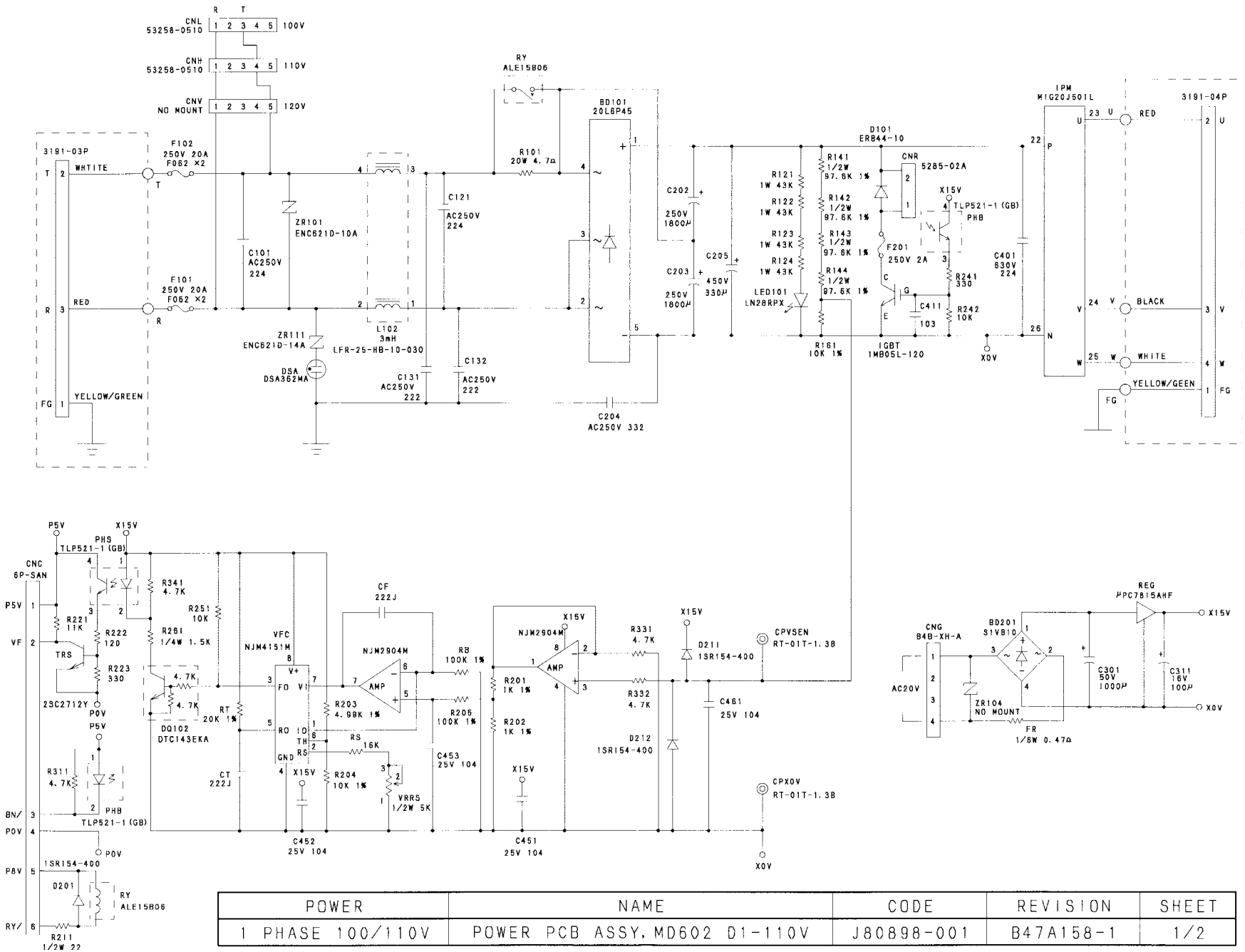


NO	POWER	COLOR
1	FG	YELLOW/GREEN
2	T	WHITE
3	R	RED



NO	MOTOR	COLOR
1	FG	YELLOW/GREEN
2	U	RED
3	V	BLACK
4	W	WHITE

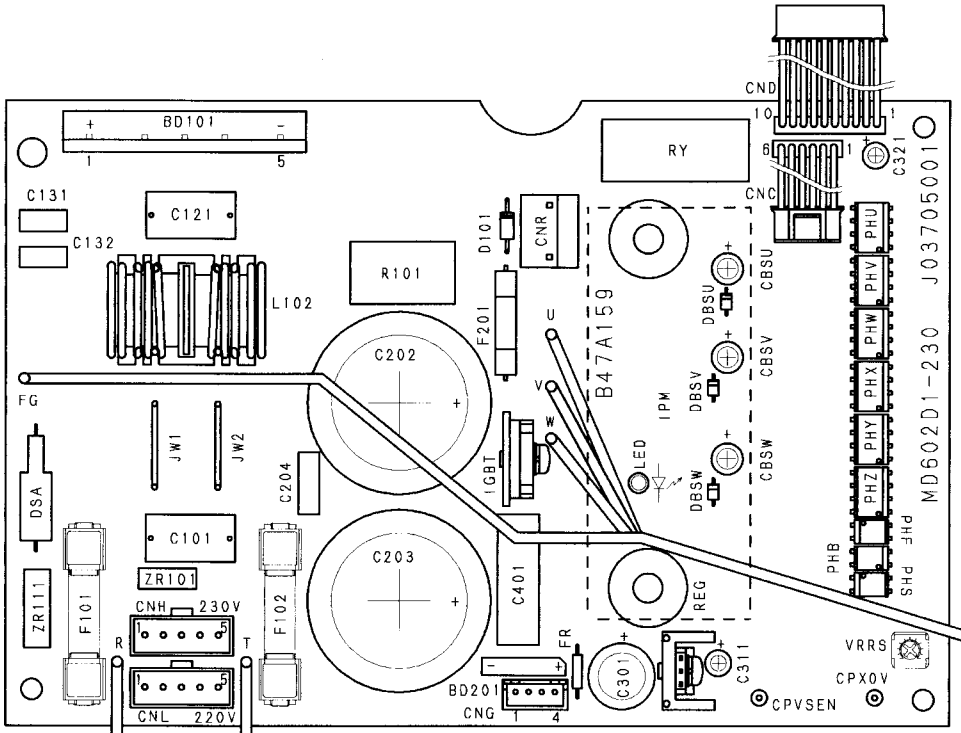
POWER	NAME	CODE	REVISION
1 PHASE 100/110V	POWER PCB ASSY, MD602 D1-110V	J80898-001	B47A158-1

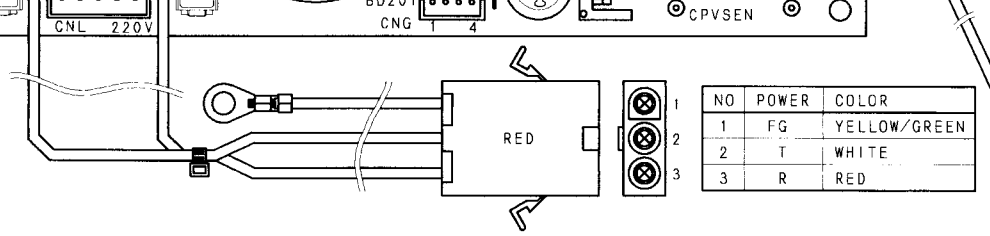


POWER	NAME	CODE	REVISION	SHEET
1 PHASE 100/110V	POWER PCB ASSY, MD602 D1-110V	J80898-001	B47A158-1	1/2

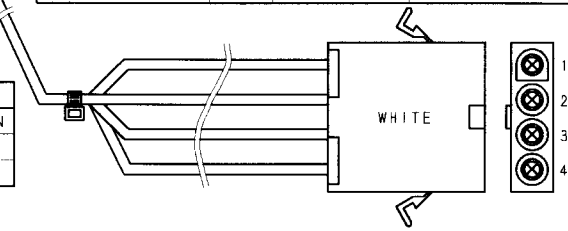
SYMBOL	Q'ty	CODE	NAME	NOTE
IPM	1	J03712-001	IPM:MIG20J501L	SOLDER SIDE
VFC	1	J03709-001	V-F CONVERTER:NJM4151M	SOLDER SIDE
AMP	1	J03622-001	OP-AMP:NJM2904M	SOLDER SIDE
IGBT	1	J00775-001	TRANSISTOR, IGBT:1MB05-120	
IGBT (HOLDER)	1	J02715-001	IGBT HOLDER	
REG	1	J00249-001	REGULATOR:UPC7815AHF	
REG (HEAT SINK)	1	J02714-001	HEATSINK:DSH-1035-SPL	
IGBT, REG (SCREW)	2	0A4300-805	SCREW, PAN(S/P WASHER)M3X8	
TRS	1	J03714-001	TRANSISTOR:2SC2712Y	SOLDER SIDE
DQ101, DQ102	2	UG5563-000	TRANSISTOR:TRDTC143EKA	SOLDER SIDE

SYMBOL	Q'ty	CODE	NAME	NOTE
BD101	1	J02699-001	DIODE, BR:D20L6P45	
BD201	1	226170-000	DIODE, BR:S1VB20	
D101	1	J02703-001	DIODE, :ERB44-10	
D201, D211, D212	3	J02625-001	DIODE, :1SR154-400	SOLDER SIDE
DBSU, DBSV, DBSW	3	J03779-001	DIODE, :1JU42	
DU, DV, DW, DX, DY, DZ	6	J02613-001	DIODE, AR:1SS302	SOLDER SIDE
ZD101	1	YE0004-705	DIODE, ZENER:UDZ4.7B+	SOLDER SIDE
LED	1	J00817-001	DIODE, LIGHT EMIT:LN28RPX(TA3)	
PHF, PHB, PHS	3	UB2859-000	PHOTO COUPLER:TLP521-1(GB)	
PHU, PHV, PHW, PHX, PHY, PHZ	6	J02465-001	PHOTO COUPLER:TLP559HV	
R101	1	J02717-001	FIXED RESISTOR, M-B20W100	
VRRS	1	UK3764-000	VARIABLE RESISTOR, C-1ROB502	
FR	1	J02706-001	FUSIBLE RESISTOR, G-A16AKR47	
L102	1	J03583-001	COIL:LF-25-10-30	
C202, C203	2	J03324-001	CAPACITOR, ALUM-ELEC 450B471	
C301	1	Y41025-591	CAPACITOR, ALUM-ELEC 50B102	
C311, C321	2	Y41012-521	CAPACITOR, ALUM-ELEC 16B101	
CBSU, CBSV, CBSW	3	Y41013-591	CAPACITOR, ALUM-ELEC 25B101	
C101, C121	2	J03616-001	CAPACITOR, POLYESTER 250B224	
C401	1	J03617-001	CAPACITOR, POLYESTER 630B224	
C131, C132	2	J03464-001	CAPACITOR, CERAMIC 2600B102	
C204	1	UG3704-000	CAPACITOR, CERAMIC 250B332	
ZR101	1	232380-001	SURGE ABSORBER:ENC621D-10A	
ZR111	1	J02696-001	SURGE ABSORBER:ENC621D-14A	
DSA	1	232384-001	SURGE ABSORBER:DSA362MA	
RY	1	J03704-001	RELAY:ALE15B06	
F101, F102	2	218469-001	GLASS FUSE, 15A-250V:FGB0	
F101, F102 (HOLDER)	4	J01684-001	FUSE HOLDER:F062	
F201	1	J02727-001	GLASS FUSE, 2A-250V:FGMLB	
CPX0V, CPVSEN	2	752246-001	PIN:RT-01T-1.3B	
CNG	1	U15643-000	CONNECTOR:B4B-XH-A	
CNR	1	J02709-001	CONNECTOR:5285-02A	
CNH, CNL	2	J02720-001	CONNECTOR:52358-0510	
CNC	1	J03688-001	WIRE ASSEMBLY, S-D6P	
CND	1	J03689-001	WIRE ASSEMBLY, S-D10P	
R, T	1	J03690-001	WIRE ASSEMBLY, 1-230V602	
U, V, W, FG	1	J03691-001	WIRE ASSEMBLY, MOTOR602	



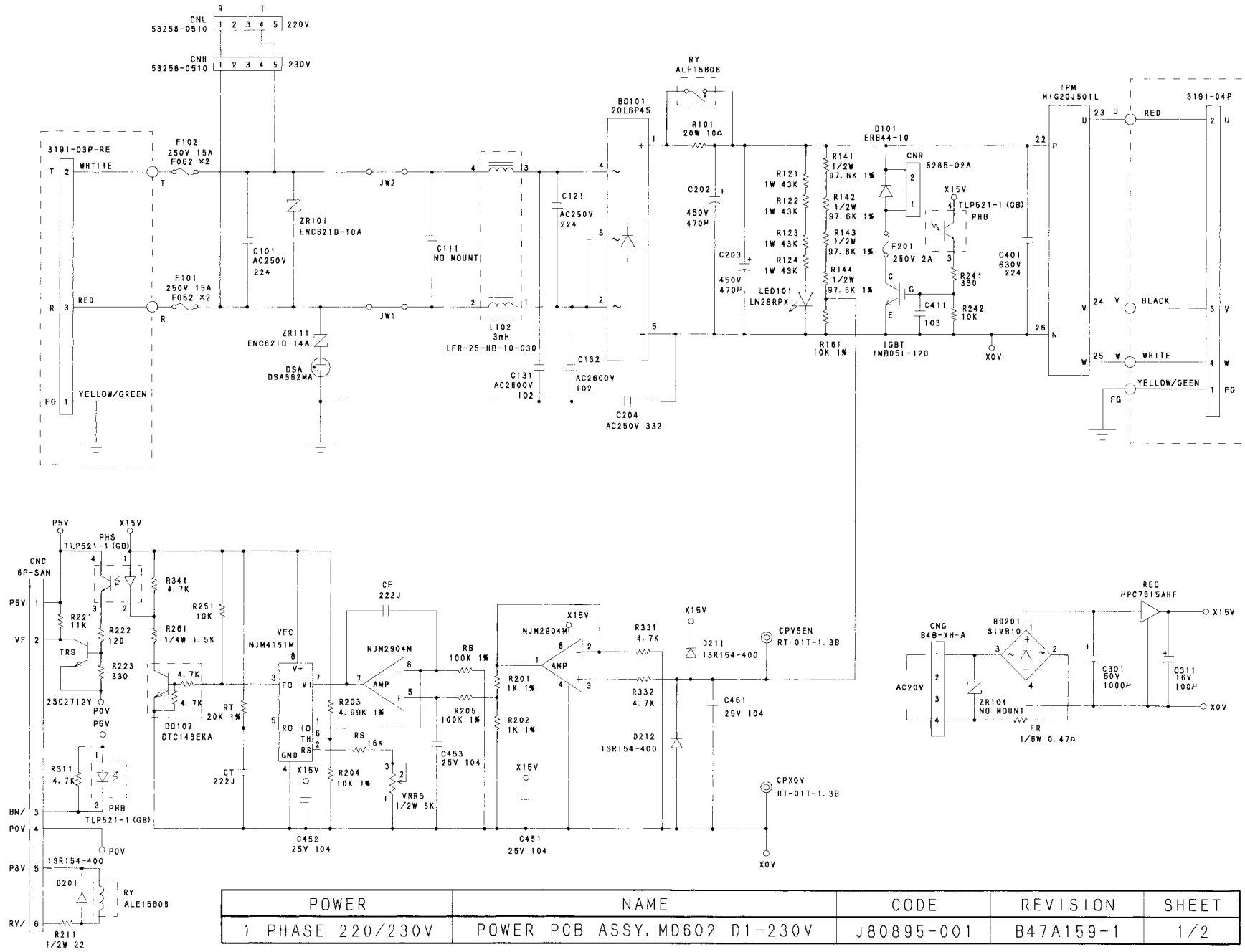


NO	POWER	COLOR
1	FG	YELLOW/GREEN
2	T	WHITE
3	R	RED



NO	MOTOR	COLOR
1	FG	YELLOW/GREEN
2	U	RED
3	V	BLACK
4	W	WHITE

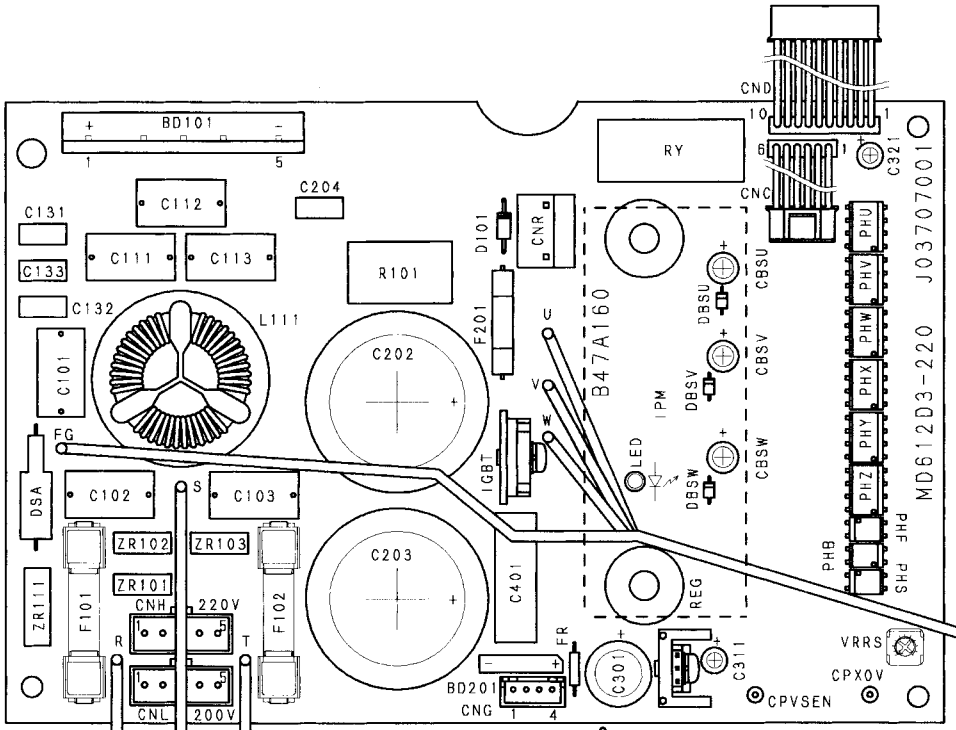
POWER	NAME	CODE	REVISION
1 PHASE 220/230V	POWER PCB ASSY, MD602 D1-230V	J80895-001	B47A159-1

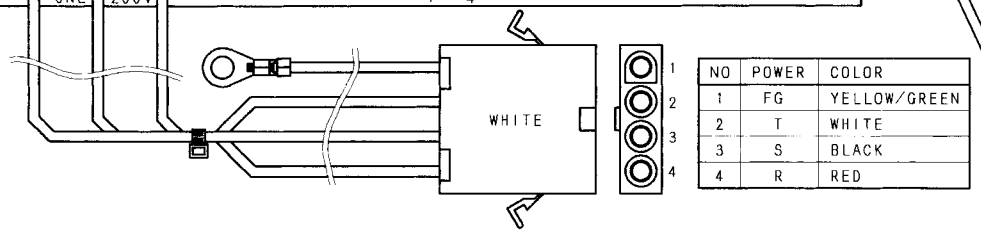


POWER	NAME	CODE	REVISION	SHEET
1 PHASE 220/230V	POWER PCB ASSY, MD602 D1-230V	J80895-001	B47A159-1	1/2

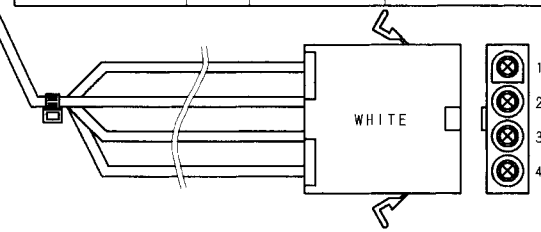
SYMBOL	Q'ty	CODE	NAME	NOTE
IPM	1	J03712-001	IPM:MIG20J501L	SOLDER SIDE
VFC	1	J03709-001	V-F CONVERTER:NJM4151M	SOLDER SIDE
AMP	1	J03622-001	OP-AMP:NJM2904M	SOLDER SIDE
IGBT	1	J00775-001	TRANSISTOR, IGBT:1MB05-120	
IGBT (HOLDER)	1	J02715-001	IGBT HOLDER	
REG	1	J00249-001	REGULATOR:UPC7815AHF	
REG (HEAT SINK)	1	J02714-001	HEATSINK:OSH-1035-SPL	
IGBT, REG (SCREW)	2	0A4300-805	SCREW, PAN(S/P WASHER)M3X8	
TRS	1	J03714-001	TRANSISTOR:2SC2712Y	SOLDER SIDE
DQ101, DQ102	2	UG5563-000	TRANSISTOR:TRDTC143EKA	SOLDER SIDE

SYMBOL	Q'ty	CODE	NAME	NOTE
BD101	1	J02699-001	DIODE, BR:D20L6P45	
BD201	1	226170-000	DIODE, BR:S1VB20	
D101	1	J02703-001	DIODE, :ERB44-10	
D201, D211, D212	3	J02625-001	DIODE, :1SR154-400	SOLDER SIDE
DBSU, DBSV, DBSW	3	J03779-001	DIODE, :1JU42	
DU, DV, DW, DX, DY, DZ	6	J02613-001	DIODE, AR:1SS302	SOLDER SIDE
ZD101	1	YE0004-705	DIODE, ZENER:UDZ4.7B+	SOLDER SIDE
LED	1	J00817-001	DIODE, LIGHT EMIT:LN28RPX(TA3)	
PHF, PHB, PHS	3	U82859-000	PHOTO COUPLER:TLP521-1(GB)	
PHU, PHV, PHW, PHX, PHY, PHZ	6	J02465-001	PHOTO COUPLER:TLP559HV	
R101	1	J02717-001	FIXED RESISTOR, M-B20W100	
VRRS	1	UK3764-000	VARIABLE RESISTOR, C-1RQB502	
FR	1	J02706-001	FUSIBLE RESISTOR, G-A16AKR47	
L111	1	J03477-001	COIL:RF25L91	
C202, C203	2	J03324-001	CAPACITOR, ALUM-ELEC 450B471	
C301	1	Y41025-591	CAPACITOR, ALUM-ELEC 50B102	
C311, C321	2	Y41012-521	CAPACITOR, ALUM-ELEC 16B101	
CBSU, CBSV, CBSW	3	Y41013-591	CAPACITOR, ALUM-ELEC 25B101	
C101~C103, C111~C113	6	J03616-001	CAPACITOR, POLYESTER 250B224	
C401	1	J03617-001	CAPACITOR, POLYESTER 630B224	
C131~C133	3	J03464-001	CAPACITOR, CERAMIC 2600B102	
C204	1	UG3704-000	CAPACITOR, CERAMIC 250B332	
ZR101~ZR103	3	232380-001	SURGE ABSORBER:ENC621D-10A	
ZR111	1	J02696-001	SURGE ABSORBER:ENC621D-14A	
DSA	1	232384-001	SURGE ABSORBER:DSA362MA	
RY	1	J03704-001	RELAY:ALE15B06	
F101, F102	2	218469-001	GLASS FUSE, 15A-250V:FGB0	
F101, F102 (HOLDER)	4	J01684-001	FUSE HOLDER:F062	
F201	1	J02727-001	GLASS FUSE, 2A-250V:FGMLB	
CPX0V, CPVSEN	2	752246-001	PIN:RT-01T-1.3B	
CNG	1	U15643-000	CONNECTOR:B4B-XH-A	
CNR	1	J02709-001	CONNECTOR:5285-02A	
CNH, CNL	2	J02720-001	CONNECTOR:52358-0510	
CNC	1	J03688-001	WIRE ASSEMBLY, S-D6P	
CND	1	J03689-001	WIRE ASSEMBLY, S-D10P	
R, S, T	1	J03693-001	WIRE ASSEMBLY, 3-220V612	
U, V, W, FG	1	J03691-001	WIRE ASSEMBLY, MOTOR602	



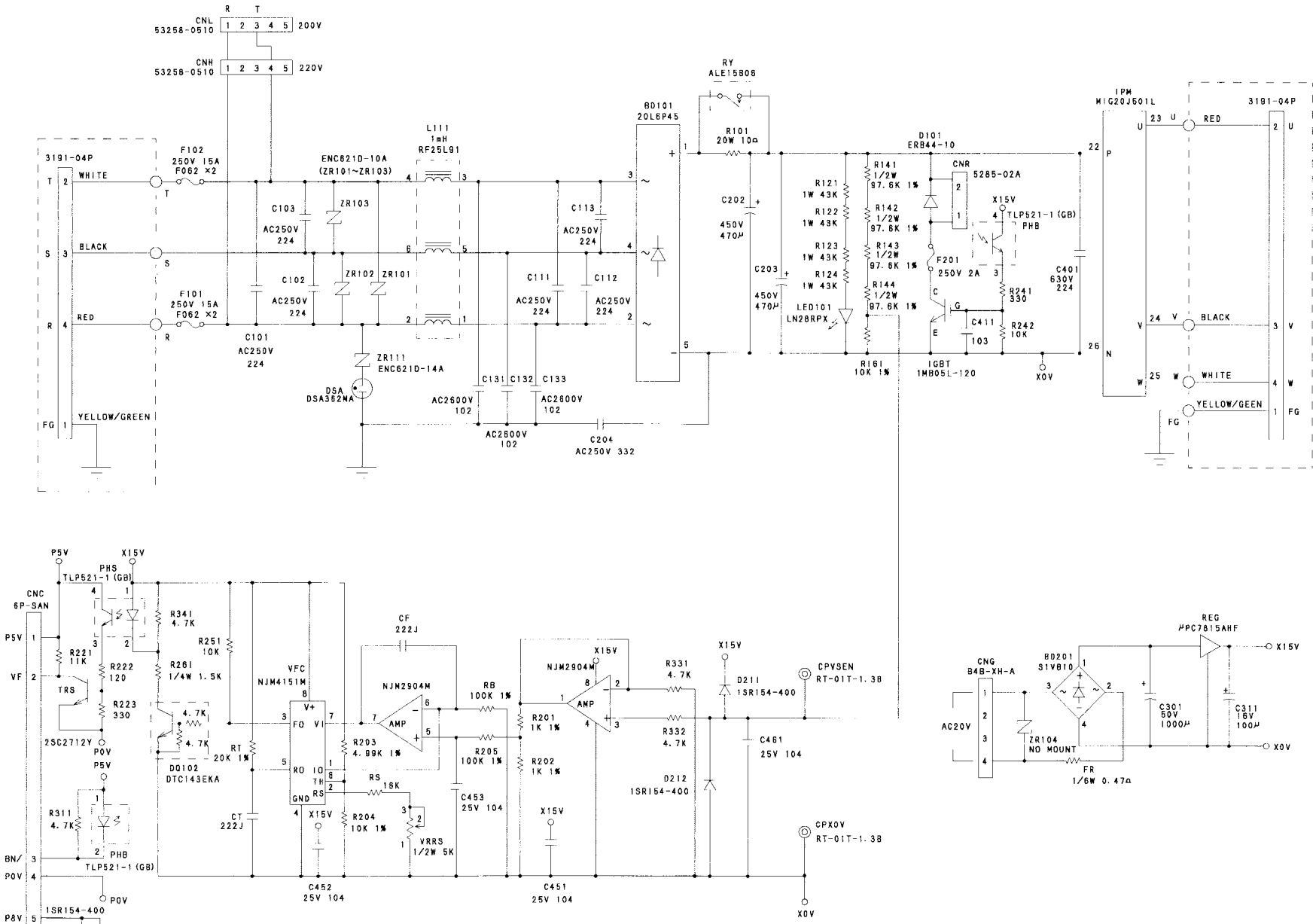


NO	POWER	COLOR
1	FG	YELLOW/GREEN
2	T	WHITE
3	S	BLACK
4	R	RED



NO	MOTOR	COLOR
1	FG	YELLOW/GREEN
2	U	RED
3	V	BLACK
4	W	WHITE

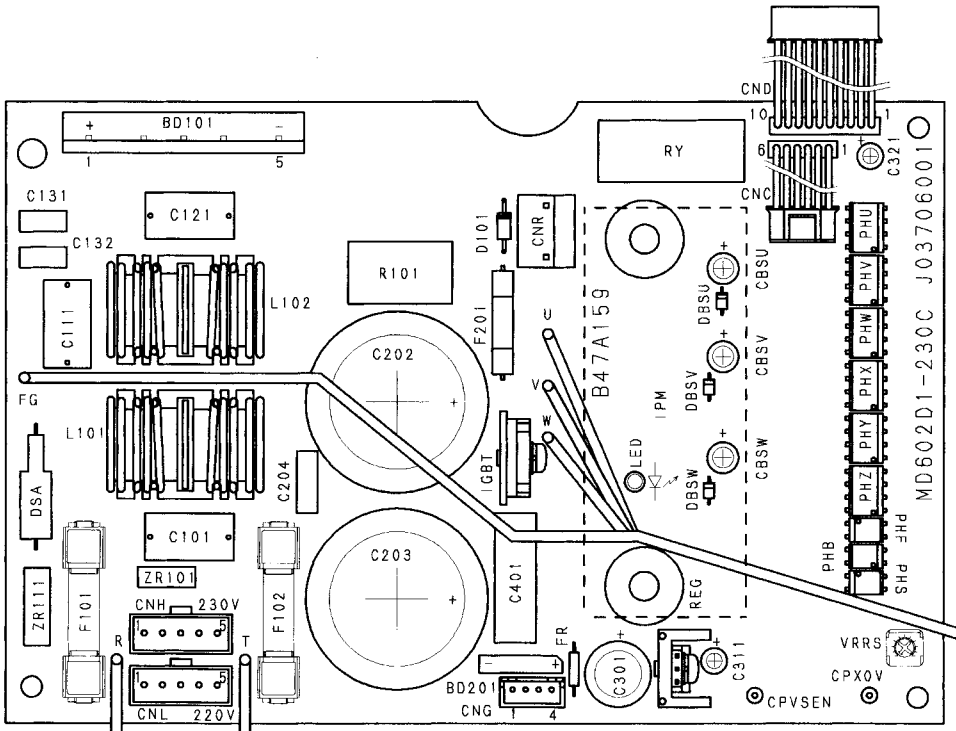
POWER	NAME	CODE	REVISION
3 PHASE 200/220V	POWER PCB ASSY, MD612 D3-220V	J80897-001	B47A160-1

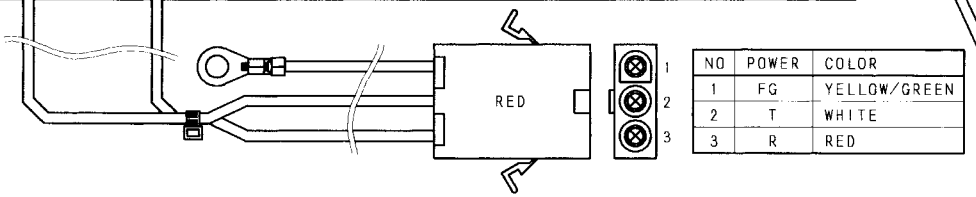


POWER	NAME	CODE	REVISION	SHEET
3 PHASE 200/220V	POWER PCB ASSY. MD602 D3-220V	J80897-001	B47A160-1	1/2

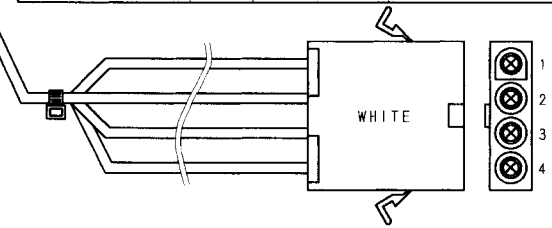
SYMBOL	Q'ty	CODE	NAME	NOTE
IPM	1	J03712-001	IPM:MIG20J501L	SOLDER SIDE
VFC	1	J03709-001	V-F CONVERTER:NJM4151M	SOLDER SIDE
AMP	1	J03622-001	OP-AMP:NJM2904M	SOLDER SIDE
IGBT	1	J00775-001	TRANSISTOR, IGBT:1MB05-120	
IGBT (HOLDER)	1	J02715-001	IGBT HOLDER	
REG	1	J00249-001	REGULATOR:UPC7815AHF	
REG (HEAT SINK)	1	J02714-001	HEATSINK:OSH-1035-SPL	
IGBT, REG (SCREW)	2	0A4300-805	SCREW, PAN(S/P WASHER) M3X8	
TRS	1	J03714-001	TRANSISTOR:2SC2712Y	SOLDER SIDE
DQ101, DQ102	2	UG5563-000	TRANSISTOR:TRDTC143EKA	SOLDER SIDE

SYMBOL	Q'ty	CODE	NAME	NOTE
BD101	1	J02699-001	DIODE, BR:D20L6P45	
BD201	1	226170-000	DIODE, BR:S1VB20	
D101	1	J02703-001	DIODE, :ERB44-10	
D201, D211, D212	3	J02625-001	DIODE, :1SR154-400	SOLDER SIDE
DBSU, DBSV, DBSW	3	J03779-001	DIODE, :1JU42	
DU, DV, DW, DX, DY, DZ	6	J02613-001	DIODE, AR:1SS302	SOLDER SIDE
ZD101	1	YE0004-705	DIODE, ZENER:UDZ4.7B+	SOLDER SIDE
LED	1	J00817-001	DIODE, LIGHT EMIT:LN28RPX(TA3)	
PHF, PHB, PHS	3	U82859-000	PHOTO COUPLER:TLP521-1(GB)	
PHU, PHV, PHW, PHX, PHY, PHZ	6	J02465-001	PHOTO COUPLER:TLP559HV	
R101	1	J02717-001	FIXED RESISTOR, M-B20W100	
VRRS	1	UK3764-000	VARIABLE RESISTOR, C-1R0B502	
FR	1	J02706-001	FUSIBLE RESISTOR, G-A16AKR47	
L101, L102	2	J03583-001	COIL:LF-25-10-30	
C202, C203	2	J03324-001	CAPACITOR, ALUM-ELEC 450B471	
C301	1	Y41025-591	CAPACITOR, ALUM-ELEC 50B102	
C311, C321	2	Y41012-521	CAPACITOR, ALUM-ELEC 16B101	
CBSU, CBSV, CBSW	3	Y41013-591	CAPACITOR, ALUM-ELEC 25B101	
C101, C111, C121	3	J03616-001	CAPACITOR, POLYESTER 250B224	
C401	1	J03617-001	CAPACITOR, POLYESTER 630B224	
C131, C132	2	J03464-001	CAPACITOR, CERAMIC 2600B102	
C204	1	UG3704-000	CAPACITOR, CERAMIC 250B332	
ZR101	1	232380-001	SURGE ABSORBER:ENC621D-10A	
ZR111	1	J02696-001	SURGE ABSORBER:ENC621D-14A	
DSA	1	232384-001	SURGE ABSORBER:DSA362MA	
RY	1	J03704-001	RELAY:ALE15B06	
F101, F102	2	218469-001	GLASS FUSE, 15A-250V:FGB0	
F101, F102 (HOLDER)	4	J01684-001	FUSE HOLDER:F062	
F201	1	J02727-001	GLASS FUSE, 2A-250V:FGMLB	
CPX0V, CPVSEN	2	752246-001	PIN:RT-01T-1.3B	
CNG	1	U15643-000	CONNECTOR:B4B-XH-A	
CNR	1	J02709-001	CONNECTOR:5285-02A	
CNH, CNL	2	J02720-001	CONNECTOR:52358-0510	
CNC	1	J03688-001	WIRE ASSEMBLY, S-D6P	
CND	1	J03689-001	WIRE ASSEMBLY, S-D10P	
R, T	1	J03690-001	WIRE ASSEMBLY, 1-230V602	
U, V, W, FG	1	J03691-001	WIRE ASSEMBLY, MOTOR602	



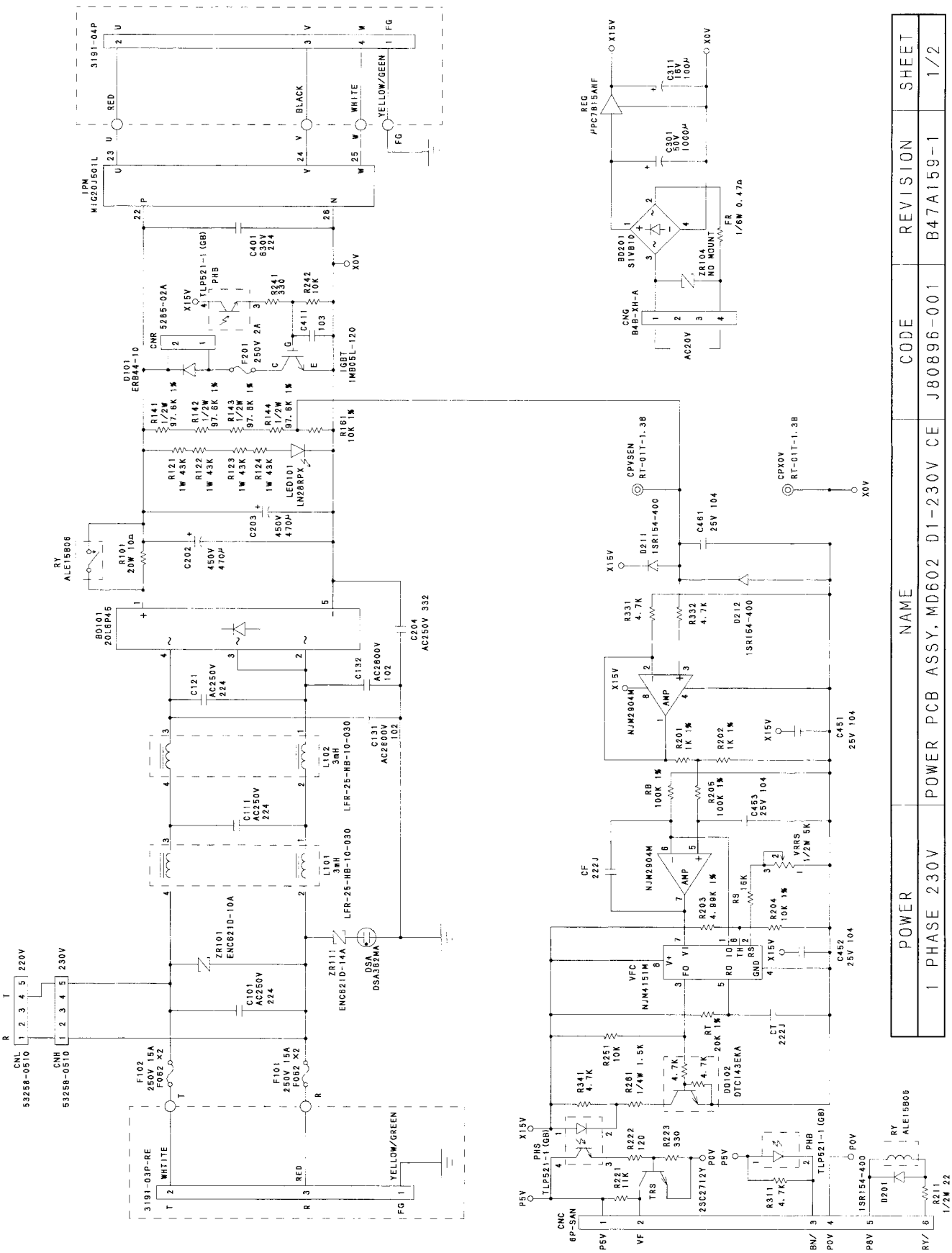


NO	POWER	COLOR
1	FG	YELLOW/GREEN
2	T	WHITE
3	R	RED

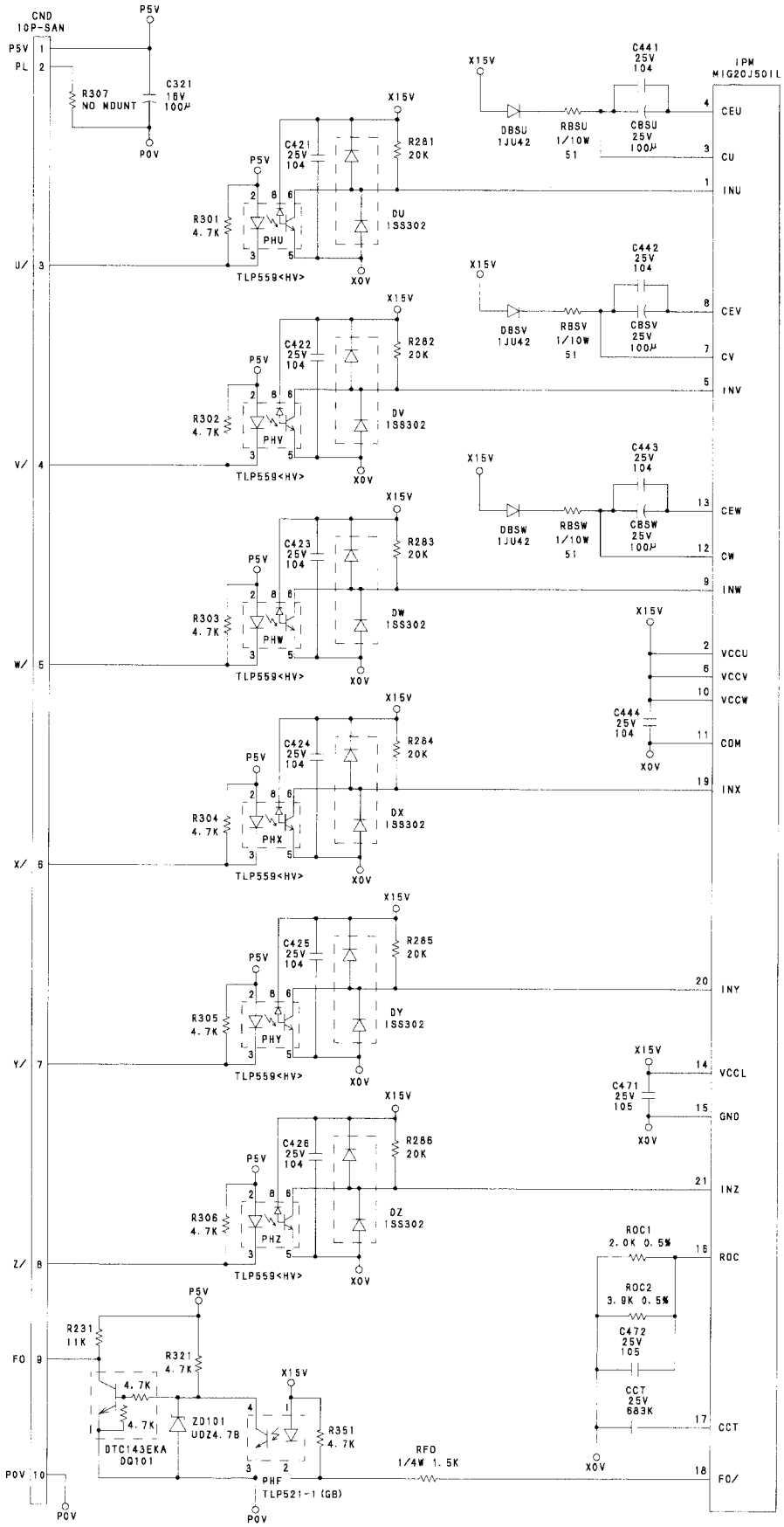


NO	MOTOR	COLOR
1	FG	YELLOW/GREEN
2	U	RED
3	V	BLACK
4	W	WHITE

POWER	NAME	CODE	REVISION
1 PHASE 230V	POWER PCB ASSY, MD602 D1-230V CE	J80896-001	B47A159-1



NAME	CODE	REVISION	SHEET
POWER PCB ASSY, MD602 D1-230V CE	J80896-001	B47A159-1	1/2
1 PHASE 230V			

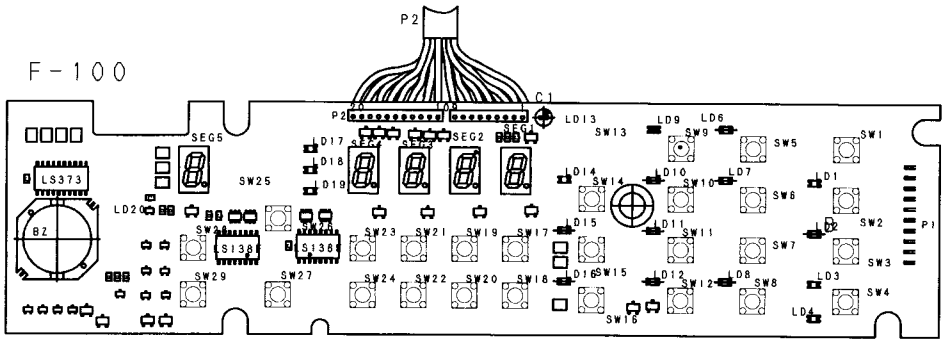


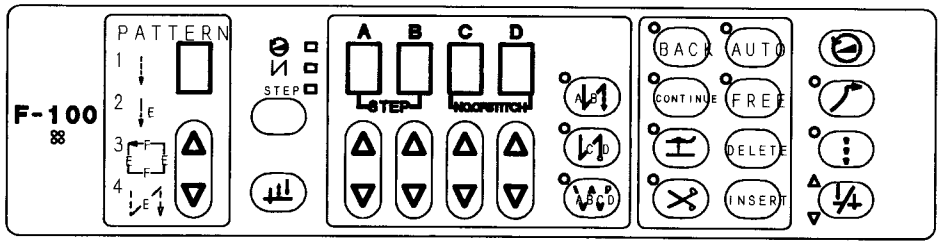
POWER	NAME	CODE	REVISION	SHEET
1 PHASE 100/110V	POWER PCB ASSY, MD602 D1-110V	J80898-001	B47A158-1	2/2
1 PHASE 220/230V	POWER PCB ASSY, MD602 D1-230V	J80895-001	B47A159-1	2/2
1 PHASE 230V	POWER PCB ASSY, MD602 D1-230V CE	J80896-001	B47A159-1	2/2
3 PHASE 200/220V	POWER PCB ASSY, MD612 D3-220V	J80897-001	B47A160-1	2/2

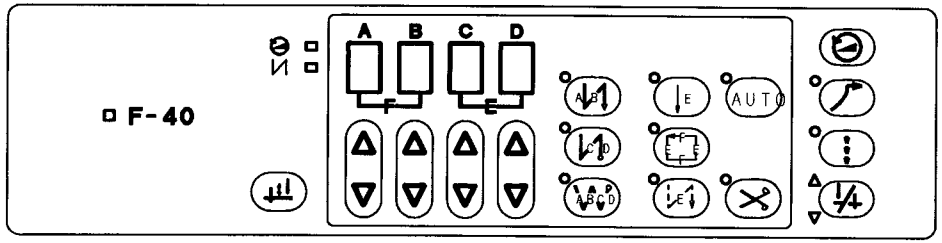
Operation Panel

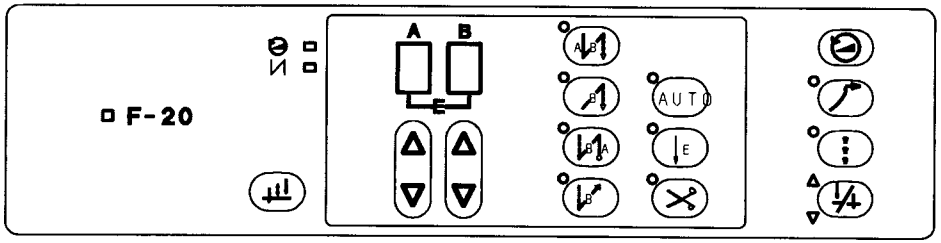
F-100, F-40, F-20

F-100



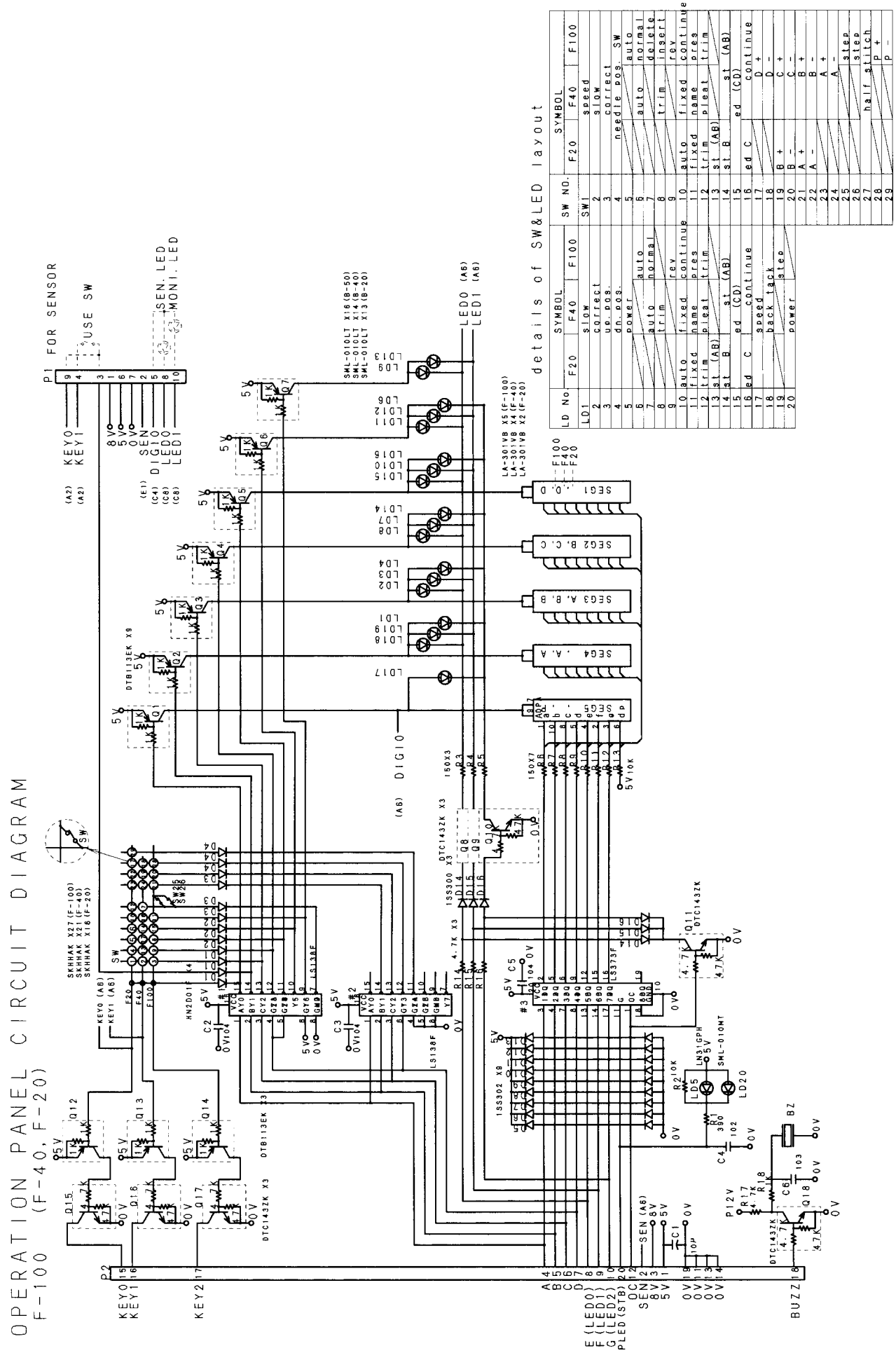






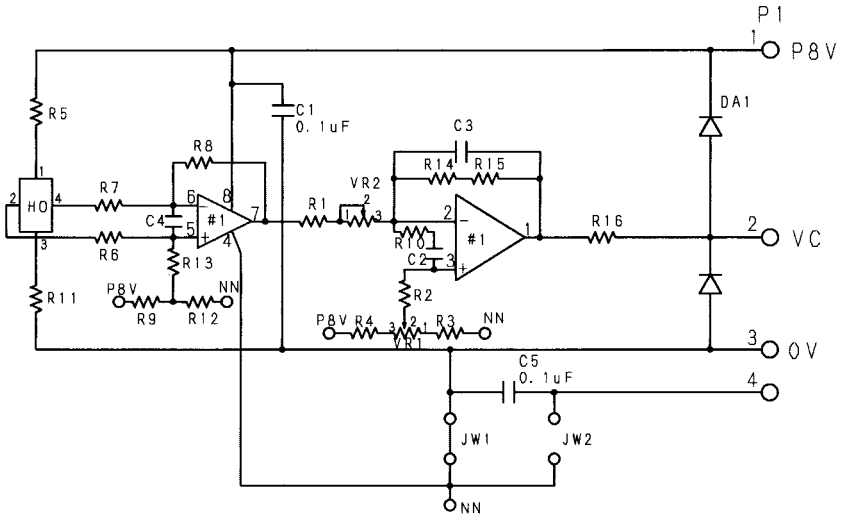
code numbers of common parts

SYMBOL	CODE	NANE	Q'ty	NOTE
#1, 2	091120138	BIPIC74LS138	2	
#3	091120373	BIPIC74LS373F	1	
Q1~7, 12, 13, 14	J00625001	TRDTB113EK	10	
Q8~11, 15~18	U38326000	TRDTC143ZK	8	
D1, 2, 3, 4	UG2520085	SIDHN2D01F	4	
D5~13	J02613001	SID1SS302	9	
D14, 15, 16	J02614001	SID1SS300	3	
SW1, 2, 3, 4, 5, 6, 7 8, 9, 10, 11, 12, 14, 15, 16, 17, 18 19, 20, 21, 22, 23 24, , 26, 27, 28 29	236387001	SWSKHVBD	27	
LD1, 2, 3, 4, 6, 7, 8 9, 10, 11, 12, , 14 15, 16, 17, 18, 19	J02485001	LEDSML-010LT	17	
SEG1, 2, 3, 4, 5	J00621001	LEDLA-301VB L	5	
R3~12	094151320	GR-C14J151	10	
R2, 13	094103120	GR-C110J103	2	
R1	094391120	GR-C110J391	1	
R14~17	094472120	GR-C110J472	4	
R18	094102120	GR-C110J102	1	
C2, 3, 5	Y81042415	C-C50C104F-T	3	
C4	Y81020015	C-C50C102B-T	1	
C6	Y81030015	C-C50B103B	1	
C1	Y41002301	A-CAPA16B100	1	
P1	U73353000	S10B-XH-A	1	
BZ1	J00626001	EFBAL30D402	1	
P2	J02487001	PLUG COAD F	1	
			1	

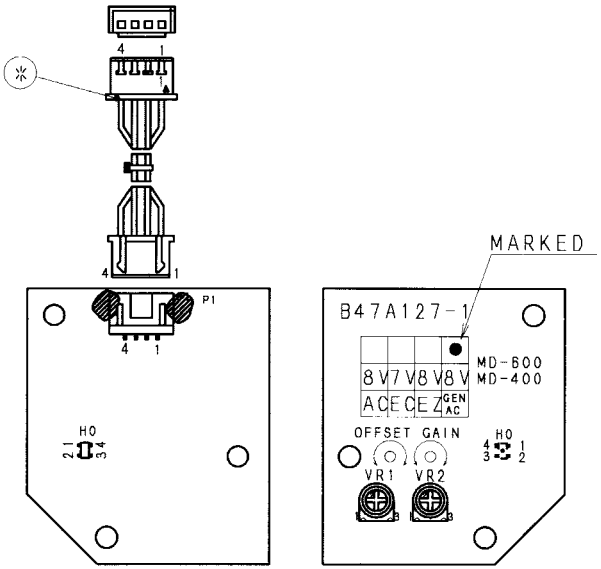


LD No	SYMBOL F20	SYMBOL F40	SYMBOL F100
LD1		slow	
2		correct	
3		up. pos.	
4		dn. pos.	
5		power	
6			auto
7		auto	normal
8		trim	
9		rev	
10	auto	fixed	continue
11	fixed	name	pres
12	trim	pleat	
13	st (AB)		
14	st B		
15		ed (CD)	
16	ed C		continue
17		speed	
18		back tack	
19			step
20		power	

SW NO.	SYMBOL F20	SYMBOL F40	SYMBOL F100
SW1		speed	
2		slow	
3		correct	
4		needle pos.	SW
5			auto
6		auto	normal
7			delete
8		trim	insert
9		rev	
10	auto	fixed	continue
11	fixed	name	pres
12	trim	pleat	
13	st (AB)		
14	st B		
15		ed (CD)	
16	ed C		continue
17		D +	
18		D −	
19	B +		C +
20	B −		C −
21	A +		B +
22	A −		B −
23			A +
24			A −
25			step
26			step
27		half stitch	
28			P +
29			P −



	P1 S4B-PH-SM3-TB
1	WHITE P8V
2	WHITE VC
3	WHITE 0V
4	WHITE



SYMBOL	CODE	Q'ty	NAME	NOTE
#1	J03684001	1	OP-AMP:NJM2115M	
HO	J03010001	1	HALL ELEMENT:THS117	
VR1	J03624001	1	VARIABLE RESISTOR, DVR-1R0B222	
VR2	J03625001	1	VARIABLE RESISTOR, DVR-1R0B103	
P1	UB6911000	1	CONNECTOR:S4B-PH-SM3-TB	
*	J03627001	1	CONNECTOR ASSY, PN8	

NAME	TREADLE PCB assy (B47A127)
CODE	J80875001

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2001. 06.